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CONTENTS

LINSLEY—A review of the Pteroplatini of North and Central America 1

ASHLOCK—A review of the genus Arphnus Stål with a new species from Mexico 17

SCHUSTER—Four new species of Mayetia from western North America 23

BREAKEY—A note on the life history of Panscopus torpidus (LeConte) 28

LINSLEY & MacSWAIN—New Diandrena associated with Oenothera and notes concerning other species 31

STEPHEN & TORCHIO—A new state record for the bee genus Heteranthidium with comments on H. zebratum Cresson 41

FLESCHNER—Releases of recently imported insect parasites and predators in California, 1958–59 43

SCULLEN—Synonymical notes on the genus Cerceris—III 45

SPILMAN—Remarks on the classification and nomenclature of the American tenebrionine genus Adelonia 49

OATMAN—Crossbreeding studies with two closely related species of Liriomyza 53

ZOOLOGICAL NOMENCLATURE 27

BOOK NOTICES AND REVIEWS 16, 52, 57

PROCEEDINGS, Pacific Coast Entomological Society, 1960 59

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The Pan-Pacific Entomologist

Vol. XXXVII January, 1961 No. 1

A REVIEW OF THE PTEROPLATINI OF NORTH AND CENTRAL AMERICA

(Coleoptera: Cerambycidae)

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The Pteroplatini are of special interest to naturalists because many of the species associate with lycids and bear a pronounced superficial resemblance to them in form and coloration. As a result, considerable convergence in color patterns has occurred, both among species of the same genus and among species of different genera, and identifications based upon published descriptions have frequently involved considerable uncertainty. Since no keys to the described genera or species of Mexico and Central America have been published, and no recent keys to any of the forms from north of Mexico, the following are offered in the hope that they will facilitate identification of the species and thus encourage field studies designed to clarify their ecological relationships.

Key to Genera

1. Pronotum not constricted, usually trapezoidal, as wide or nearly as wide at base as elytra 2
— Pronotum constricted, much narrower at base than elytra 5
2(1). Antennae with segments carinate, armed with short spines 3
— Antennae without carinae or apical spines 4
3(2). Elytra broad at base and gradually widened toward apex, their greatest joint width about two-thirds of their length; pronotum with a foliaceous lateral margin ..... *Deltosoma*
— Elytra narrow at base and usually flaring from near middle, their greatest joint width only about one-half of their length; pronotum with lateral margin rounded or obtusely elevated, not foliaceous; antennae often with basal segments densely hairy or penicillate-fimbriate beneath ..... *Cosmoplatidius*
4(2). Body flattened, elytra broadly explanate, flaring, quadricostate ..... *Pteroplatidius*

[1]This is one of a number of studies made possible by the National Science Foundation during the author's tenure as Miller Research Professor, University of California. Types of described species were kindly made available at the American Museum of Natural History, New York, by J. G. Rozen, Jr., at the British Museum (Natural History), London, by E. B. Britton, at the California Academy of Sciences, San Francisco, by E. S. Ross, at the Museum of Comparative Zoology, Harvard University, Cambridge, Massachusetts, by P. J. Darlington, at the Museum National d'Histoire Naturelle, Paris by Andre Villiers, and at the Naturhistoriska Riksmuseet, Stockholm, by E. Kjellander.

— Body cylindrical, elytra not flaring, tricostate.....*Parathetesis*

5(1). Intermediate and posterior femora linear or gradually enlarged or feebly clavate near middle; antennae variable.....6

— Intermediate and posterior femora pedunculate and abruptly clavate beyond middle; antennae short, first five segments filiform, penicillate-fimbriate or densely clothed with long hairs, sixth to tenth segments produced slightly at apex but not serrate .....*Corynellus*

6(5). Scutellum not or scarcely longer than broad, rounded behind or obtusely triangular, apex not produced; body lyciform, pronotum and elytra flattened, the latter often expanded apically.....7

— Scutellum elongate-triangular, apex acute, usually produced; body large, subcylindrical .....*Parevander*

7(6). Antennae filiform or serrate, not penicillate-fimbriate.....8

— Antennae with some or all of the basal segments penicillate-fimbriate, outer segments cylindrical.....*Pteroplatus*

8(7). Antennae about half as long as body in male, shorter in female, outer segments produced at their apices, serrate, eleventh segment appendiculate; elytra usually distinctly costate..... *Elytroleptus*

— Antennae about as long as body in male, shorter in female, segments filiform or nearly so, eleventh segment not appendiculate; elytra flat, not costate.....*Holopleura*

Genus DELTOSOMA Thomson

Deltosoma Thomson, 1864, Systema Cerambycidarum, p. 258; Lacordaire, 1869, Genera des Coléoptères, 9:163; Bates, 1880, Biologia Centrali-Americana, Coleoptera, 5:72.

Species in this genus of lyciform cerambycids are broader across the shoulder than those of related genera, and the pronotum has a broadly expanded foliaceous lateral margin. Two species are known from Central America as follows:

DELTOSOMA GUATEMALENSE Bates

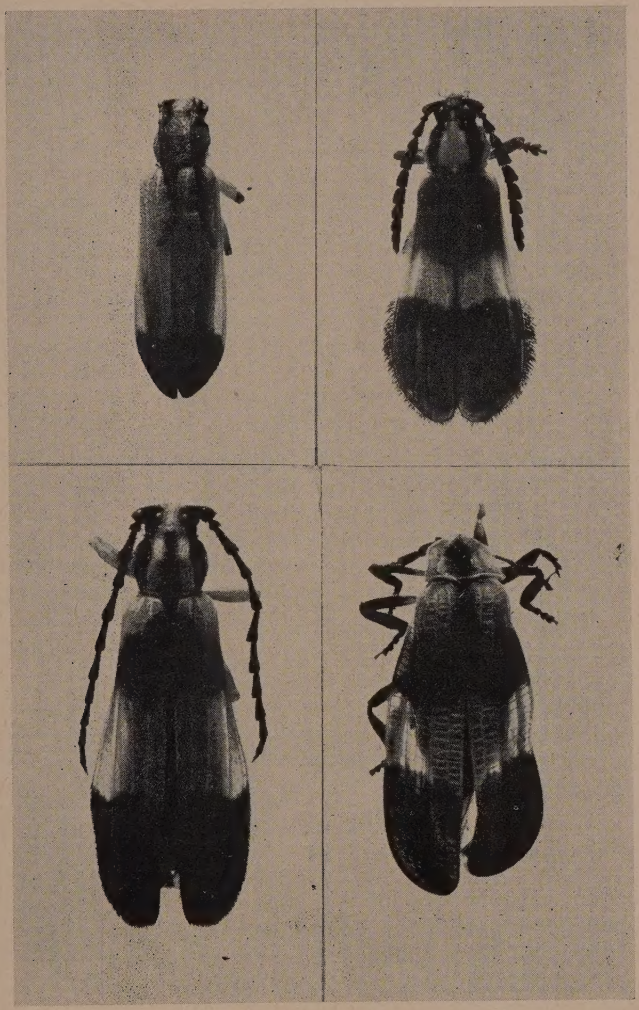
Deltosoma guatemalense Bates, 1880, Biologia Centrali-Americana, Coleoptera, 5:72.

In this species the appendages are black, the pronotum is margined with tawny yellow, and the elytral humeri and a broad transverse median band are also tawny yellow. This in size (11–17 mm.) and coloration closely suggesting the common Central American *Calopteron serratum* (Linnaeus). The type series is from San Geronimo, Guatemala.

DELTOSOMA FLAVIDUM Aurivillius

Deltosoma flavidum Aurivillius, 1925, Ark. Zool. 17A(12):9.

D. flavidum is golden ochraceous with the antennal flagellum black. The elytra are concolorous in the male type but in a female example from Summit, Panama Canal Zone, January 1947 (N. L.



EXPLANATION OF FIGURES

Fig. 1. (upper left): *Elytroleptus dichromaticus* Linsley, ♀. Fig. 2. (upper right): *Pteroplatidius octocostatus* (Bates), ♀. Fig. 3. (lower left): *Elytroleptus grandis* Linsley, ♀. Fig. 4. (lower right): *Calopteron* sp. with which *E. grandis* was taken at Cuernavaca, Mexico.

H. Krauss, U. S. National Museum) there is an ill-defined median piceous line between the suture and first costa, a shorter parallel line between sublateral costa and lateral margin, and a similar dark area on the epipleuron. This specimen also has somewhat piceous tarsi and vague dark areas at the sides of the thoracic sternum and abdomen. The antennae of the male are twelve-segmented and exceed the elytral apices by about four segments, those of the female are eleven-segmented and reach to the apical one-fourth of the elytra. Length 16 mm. The type locality is Lino, Panama.

Genus COSMOPLATIDIUS Gounelle

Cosmoplatus (Cosmoplatidius) Gounelle, 1911, Ann. Soc. Ent. France, 1911: 131.

The flattened, posteriorly expanded, costate elytra with the apices separately rounded distinguish this genus from *Cosmoplatus*. The antennae range from filiform with the second to sixth antennal segments sparsely ciliate beneath [*C. annulipes* (Blanchard), *C. simulans* (Bates)] to species in which the segments are densely fasciculate-fimbriate [*C. sellatus* (White), *C. ochraceus* Linsley], but in none do the hairs reach the proportionate length of those in the type species of *Cosmoplatus*. Only one species has thus far been found in Central America.

COSMOPLATIDIUS SELLATUS (White)

Pteroplatus sellatus White, 1853, Catal. Coleopt. British Mus., 7:82, pl. 3, fig. 3; Bates, 1880, Biologia Centrali-Americana, Coleoptera, 5:73.

Yellow, with a pair of longitudinal black bands on the head, a black marginal line and a sublateral longitudinal stripe on each side of the pronotum that coincides with the dark areas on the head, and the elytra usually with a broad black area over the apices and commonly with a transverse antemedian band in addition. The appendages and abdomen are black. However, a series of sixty examples from fruit-fly traps (presumably baited with mangoes) at El Cermeno, Panama, April to October (J. Zetec) (U. S. National Museum), exhibit three distinct color patterns: (1) elytra almost entirely yellow, the apices being very narrowly black, (2) the apices broadly (apical one-fourth) black, and (3) the apices and an ante-median band black. Forty-eight males segregated almost evenly into the three groups, 16, 15, and 17; twelve females as follows: 1, 5, 6.

This species is known from southern Mexico, Guatemala, Honduras, Costa Rica, Nicaragua, and Panama. The fully devel-

oped color pattern suggests that of the lycid *Calopteron serratum* (Linnaeus), a common Central American species.

The following species, although not Central American, is described at this time because of its close relationship to *C. sellatus* (White).

Cosmoplatidius ochraceus Linsley, new species

Male: Golden ochraceus, clothed with golden pubescence, mandibles rufo-piceous, antennal segments beginning with third becoming successively more piceous, second to sixth segments densely penicillate-fimbriate beneath, the hairs golden on second segment, predominantly golden on third segment, predominantly black on segments four to six. Head finely punctate above, more densely and less finely so in a depression behind upper lobe of eye, densely clothed with fine appressed golden pubescence which conceals the surface beneath, shining and subglabrous; antennae slightly longer than the body, segments three to ten carinate, third to seventh feebly bispinose, the spines longer and more distinct on segments eight to ten. Pronotum at base as wide as elytra, posterior angle lobed, surface finely punctate, more densely and less finely so in a vaguely darker longitudinal impression on each side of disk and on lateral margin, pubescence fine, appressed, golden, obscuring surface; prosternum finely punctate and pubescent, with coarser punctures superimposed at sides; mesosternum shining; metasternum dullish, finely densely punctate, pubescent. Elytra flaring from in front of middle but greatest width only about one-half their length, epipleurae vertical, continued posteriorly as a costiform ridge, a second costa nearer the suture finely densely punctate with coarser punctures superimposed, the latter mostly separated by two or more diameters, pubescence fine short, golden, with an intermixture of coarse suberect golden setae arising from the coarse punctures, short near base and becoming longer toward apex, apices separately rounded, not tuberculate, densely fringed with golden pubescence and setae. Legs slender, femora not clavate or pedunculate, finely pubescent with scattered suberect coarse setae. Abdomen dullish, finely punctate and pubescent, with scattered suberect hairs intermixed. Length 12 mm.

Holotype male, LAKE SAPATOZA REGION, CHIRIGUANA DISTRICT, COLOMBIA (C. Allen) in the British Museum (Natural History), London.

This species is very similar to *Cosmoplatidius sellatus* (White), but differs in the uniformly golden ochraceous coloration, finer punctation of the head and antennal scape, more feeble antennal spines, and less prominent, more acute mandibles. Superficially, it has a counterpart in *Deltosoma flavidum* Aurivillius, as is often the case among lycid-resembling Cerambycidae.

Genus CORYNELLUS Bates

Corynellus Bates, 1885, Biologia Centrali-Americana, Coleoptera, 5:318.

This genus is readily distinguished by the abruptly clavate

and pedunculate intermediate and posterior femora. Although Bates considered the species to have the facies of gallerucids rather than lycids, they appear lyciform to me. Thus *C. mimulus* Bates suggests a small lycid such as *Lycus (Lycostomus) semiustus* Chevrolat, *Lycus angulatus* Gorham, or *Calopteron scapulare* Gorham, *C. ochraceus* an *Idiopteron*, such as *I. decipiens* Gorham, or *miniatum* Gorham. In any event, field studies will be necessary to determine if such resemblances reflect mimetic relationships.

Three species are known to me, and although one of these is South American it is included for the sake of completeness.

1. Antennae with basal segments ciliate internally not penicillate.....2
– Antennae with basal segments penicillate, third to sixth segments internally and three to five externally, densely clothed with long hairs; golden ochraceus, antennae, tibiae, tarsi, sides of metathorax and margins of abdominal sternites piceous. 9.5 mm. Colombia .....*aureus* Linsley
2 Black, head, pronotum except for three longitudinal black bands, and basal half of elytra except sutural area yellowish brown; pronotum with scattered coarse punctures about as large as those of base of elytra. 9 mm. Mexico.....*mimulus* Bates
– Ochraceus, antennae, a triangular area on vertex and a broad median longitudinal band on pronotum black, femoral apices, tibiae, tarsi, and abdomen piceous; pronotum without scattered coarse punctures. 7 mm. Panama.....*ochraceus* Bates

Corynellus aureus Linsley, new species

Golden ochraceous, except antennae, tibiae, tarsi, sides of metathorax and margins of abdominal sternites which are piceous, pubescence golden except on antennae, tibiae and tarsi, where it is black. Head finely punctate above, shining impunctate and glabrous beneath; antennae reaching beyond middle of elytra, third to fifth segments cylindrical, densely clothed with long erect hairs internally and externally, although the fifth has fewer hairs externally; fifth segment a little longer than third, third segment a little longer than fourth, sixth to tenth segments, shorter, thicker, slightly produced externally but not serrate, sixth segment densely clothed with long hairs internally, sixth to tenth segments with a few long hairs externally at apex. Pronotum distinctly wider than long, broadly rounded, sublateral area densely clothed with appressed golden pubescence which is largely directed laterally or antero-laterally, disk and sides shining, subglabrous, with scattered coarse punctures, denser at middle of disk pro-, meso-, and metasterna shining, impunctate, glabrous. Elytra flaring slightly beyond the middle, very feebly costate, distinctly punctate, the basal punctures moderately coarse, mostly separated by about one diameter, becoming smaller and shallower beyond middle but evident to apex, pubescence very short, fine, golden, not obscuring surface; apices rounded to suture. Legs short, posterior femora falling far short of elytral apices, pedunculate, abruptly clavate beyond middle, polished and shining. Length 9.5 mm.

Holotype, female (?), LAKE SAPATOZA REGION, CHIRIGUANA DISTRICT, COLOMBIA, viii–ix, 1924 (C. Allen) in the British Museum (Natural History).

Although *Corynellus aureus* differs from the two previously described species in the form of the antennae, which resemble *Pteroplatus,* and the facies, which is more like *Elytroleptus,* it agrees well with them in general form and in the pedunculate and abruptly clavate femora. In coloration, *C. aureus* converges with *Cosmoplatidius ochraceus* Linsley, from the same region, suggesting the possibility that they may have the same model.

Genus PAREVANDER Aurivillius

Parevander Aurivillius, 1912, Coleopterorum Catalogus, 39:453.

This genus contains four closely related species, all confined to Mexico and Central America. They are large and subcylindrical but have the basic elements of lycid coloration, perhaps suggesting how lycid mimicry may have arisen in this group. The following key is designed to separate the known species.

KEY TO THE SPECIES OF PAREVANDER

1. Pronotum with sides broadly rounded anteriorly 2
– Pronotum with sides obliquely narrowed to apex from lateral tubercle; elytra yellow or slightly orange yellow, the apices broadly covered with black and with a transverse black band in front of middle (rarely lacking). 12-19 mm. Southern Mexico and Guatemala ..... *xanthomelas* (Guerin)
2. Elytra with black or bluish-black maculations 3
– Elytra concolorous, yellow or orange; scutellum with sides incurved, apex acute. 20-23 mm. Costa Rica ..... *unicolor* (Bates)
3. Scutellum with sides incurved, apex acute; elytra with apices broadly black and with a large, somewhat oval circumscutellar black area. 15-24 mm. Southern Mexico and Guatemala..... *nietoi* (Guerin)
– Scutellum with sides straight, apex liguliform; elytra with apices broadly black, rarely with a small circumscutellar black area. 17-24 mm. Nicaragua ..... *nobilis* (Bates)

Parathetesis Linsley, new genus

Form elongate, cylindrical, elytra fringed apically but not flaring. Head relatively small; antennal tubercles slightly elevated, quadrate; antennae with segments somewhat flattened and slightly expanded toward their apices, not carinate, not spinose, third segment distinctly larger than following. Pronotum trapezoidal, base nearly as wide as elytra, sides feebly tuberculate, disk with a callous behind middle; prosternum with intercoxal process feebly produced behind coxae, then narrowed and subacute, cavities open behind; mesosternum sloping in front and nearly plane, intermediate coxal cavities open to epimeron; metasternum with episterna moderately broad in front, gradually narrowed posteriorly. Scutellum triangular. Elytra tricostate, the

costae most evident near middle, apices separately broadly rounded. Legs slender; femora sub-linear.

TYPE OF GENUS: *Athetesis convergens* Bates.

This genus differs from *Athetesis* and *Parevander* in the trapezoidal prothorax which is nearly as wide at the base as the elytra and has only a feeble lateral tubercle, and the form of the scutellum which is triangular (in *Athetesis* it is broad and suboval, in *Parevander* it is elongate and produced). From the latter it further differs in the shorter, more flattened antennae.

PARATHETESIS CONVERGENS (Bates)

Athetesis convergens Bates, 1892, Trans. Ent. Soc. London, 1892:171.

Somewhat rufo-testaceous, base of head, antennae, a longitudinal stripe on each side of pronotal disk, base of elytra except suture and margins, apices of elytra, sides of meso- and metasterna, trochanters, femoral apices broadly, tibiae and tarsi black. Head with some black hairs, denser near eyes; antennae slightly surpassing middle of elytra. Pronotum with disk coarsely punctate, thinly clothed with golden hairs, longitudinal stripes densely black pubescent. Elytra finely densely punctate and black pubescent in median yellow area. Femora finely densely punctate, thinly pubescent. Length 19 mm.

The type is from Amula, Guerrero, at 6,000 feet elevation. The coloration is lycid-like but the form is cylindrical, not flattened or explanate.

Pteroplatidius Linsley, new genus

Form flattened, elytra broadly explanate, flaring, densely fringed with long hair. Head moderate, front relatively short; antennae reaching to middle of elytra in the male, slightly shorter in the female, segments flattened and apically expanded, especially fifth to tenth, much more so in the female than in the male, first four segments clothed with long black hairs. Pronotum transverse, widest and subangulate at middle but base not distinctly constricted and not much narrower than base of elytra, sides without an oval impression; prosternum with intercoxal process expanded slightly behind coxae, then narrowed, cavities open behind; mesosternum sloping in front and nearly plane, intermediate coxal cavities open to epimera; metasternum with episterna moderately broad, narrowed slightly posteriorly. Scutellum subtriangular but apex not acute. Elytra with apical area quadricostate, the intercostal space coarsely, irregularly but more or less transversely reticulate, apices separately but narrowly rounded. Legs slender; femora feebly incrassate.

TYPE OF GENUS: *Pteroplatus octocostatus* Bates.

This genus is proposed for a species which superficially resembles *Elytroleptus* but differs markedly in the form of the prothorax which is not constricted at the base and lacks a lateral oval impression, and the much more explanate elytra which are densely fringed with long hair.

PTEROPLATIDIUS OCTOCOSTATUS (Bates)

(Fig. 2)

Pteroplatus octocostatus Bates, 1880, Biologia Centrali-Americana, Coleoptera, 5:73.

Elytroleptus octocostatus Bates, 1885, Biologia Centrali-Americana, Coleoptera, 5:317.

Two examples, one of each sex, are before me, both from the state of Vera Cruz, Mexico. The male is from Cordoba (A. Fenyes, Calif. Acad. Sci.) and has yellowish elytra with the apical two-fifths or more, bluish-black. The female, from San Rafael, Jicaltepec, March 13, 1896 (F. C. Bowditch Coll., Mus. Comp. Zool.), in addition, has the basal two-fifths, except the humeri and epipleura blackish, but less so than the apex, the two dark areas narrowly connected along the suture. Whether these differences in color pattern, one *Lycus*-like, the other *Pteroplatus*-like, represent consistent differences between the sexes remains to be seen. Bates considered his type specimen, which is colored like the Cordoba male, to be a female. Length 11–14 mm.

Genus PTEROPLATUS Buquet

Pteroplatus Buquet, 1840, Ann. Soc. Ent. France, 9:385.

This genus is principally South American, twelve species having been described from Columbia, others from Bolivia, Venezuela, and Argentina. The removal of several species to *Cosmoplatidius* (see above) makes a more homogeneous group of the remaining species. The Central American form belongs to that section of the genus in which the elytra are less flaring, their joint width at the greatest point being only about half of the length from base to apex.

PTEROPLATUS QUADRISCOPULATUS Bates

Pteroplatus quadriscopulatus Bates, 1880, Biologia Centrali-Americana, Coleoptera, 5:73.

Black or bluish-black; pronotum yellowish, with a median longitudinal black stripe and a lateral black stripe on each side; elytra yellowish with a broad black area over apices and often with a transverse ante-median black band, the two sometimes merging to leave only the humeri pale, or the anterior band reduced or forming a basal stripe along suture. Length 10-15 mm.

This species occurs in southern Mexico and Guatemala. No doubt a study of the habits would explain the extreme variability of the elytral color pattern, a variation which is also evident in its South American counterpart, *P. variabilis* Sallé.

Genus ELYTROLEPTUS Dugés

Elitroleptus Dugés, 1879, La Naturaleza Mexicana, 4:182.

Elytroleptus Bates, 1885, Biologia Centrali-Americana, Coleoptera, 5:317.

This genus is principally Mexican, a few species extending their range across the borders of southwestern United States and one occurring in eastern North America from eastern Texas and Florida to southern Canada. The adults join aggregations of particular species of lycids, to which they usually bear a remarkable resemblance in size, form, and coloration (figs. 3, 4).

Key to the Species of Elytroleptus

1. Elytra bicolored or black 2
– Elytra concolorous yellow or rufo-testaceous 10
2(1). Elytra with basal half or three-fourths yellow or rufo-testaceous, anterior margin of apical dark area arching to suture or more or less transverse 3
– Elytra black or with ante-median and apical black areas or with anterior margin of apical dark area extending obliquely forward to suture 5
3(2). Pronotum thinly clothed with erect hairs which do not obscure the shining and very coarsely confluently punctate surface; elytra tricostate; smaller species, 7-10 mm. 4
– Pronotum largely clothed with appressed silky pubescence which obscures the surface, punctation moderately coarse; elytra quadricostate apically; large species, 12-17 mm. Western Texas to southern Arizona and northern Mexico (Chihuahua, Durango) ..... *apicalis* (LeConte)
4(3). Elytra very coarsely deeply punctate, basal area with only about three rows of punctures between the costae, pubescence short and obscure, integument rufo-testaceous, apical fourth or fifth black, anterior margin of dark area transversely sinuate. 10 mm. Mexico (Queretaro, Hidalgo) ..... *dichromaticus* Linsley, ♀
– Elytra moderately coarsely and shallowly punctate, basal area with five or six rows of punctures between the costae, pubescence long and conspicuous, integument lemon yellow, apical one-third black, anterior margin of dark area arched to the suture. 7-10 mm. Mexico (Sonora, Chihuahua, Sinaloa, Morelos, Nayarit, Mexico, Guerrero) ..... *scabricollis* Bates
5(2). Elytra gradually dilated from base, quadricostate toward apex; large species, 13-15 mm. in length 6
– Elytra subparallel, at most slightly widened apically, tricostate; small species, 7-11 mm. in length 7
6(5). Elytra entirely black; pronotum with sides angulate, surface densely clothed with appressed golden tomentum except for an oval black area on posterior half of disk and another black area on each side behind lateral angle. 13 mm. Mexico (Oaxaca) ..... *nigripennis* Bates

– Elytra with humeral area and a broad median band yellowish-testaceous; pronotum with sides obtusely or broadly rounded, surface densely clothed with appressed golden tomentum except for median and lateral longitudinal black vittae. 15 mm. Mexico (Mexico and Vera Cruz) ..... *grandis* Linsley

7(5). Pronotal disk with a pair of yellow or red, finely punctate, densely pubescent, longitudinal bands on each side of middle and a similar band along anterior margin and on each side at base 8

– Pronotal disk coarsely punctate and subglabrous, without finely punctate, pubescent bands 9

8(7). Pronotum with golden yellow bands; elytra strongly costate, pale areas distinct. 8-10 mm. Southeastern Canada to Florida and eastern Texas ..... *floridanus* (LeConte)

– Pronotum with red bands; elytra less strongly costate, pale areas reduced or absent in typical form, basal one-fourth reddish-yellow extending obliquely backward from sutural margin to side and along lateral margin to apex in var. *obliquus*. 7-10 mm. Western Texas (Davis and Chisos Mountains) ..... *immaculipennis* Knull

9(7). Elytra not more than three times as long as basal width, basal punctures as coarse as those of disk of pronotum, costae distinct throughout, integument pale yellow, dark area confined largely to apical half; pronotum ferrugineous, with an oval darker impression on each side; abdomen black or piceous; posterior tibiae, apex of intermediate tibiae, and tarsi black. 8-9 mm. Texas and northern Mexico (Tamaulipas) ..... *divisus* (LeConte)

– Elytra nearly three and one-half times as long as basal width, basal punctures much less coarse than those of disk of pronotum, costae distinct at base only, integument rufous or rufo-testaceous, dark area covering most of elytra except base and sides; pronotum rufous or piceous, without an oval impression at sides; abdomen rufo-testaceous, tarsi and all of the tibiae black. 6-11 mm. Northern Mexico (Chihuahua) ..... *humeralis* Linsley

10(1). Pronotum yellow or yellow-orange, if margined or clouded with black, disk predominantly yellow 11

– Pronotum black or with extensive black areas, mid-line of disk always black 14

11(10). Head and pronotum yellow-orange, pronotum somtimes margined with black or clouded with black, elytra yellow or yellow-orange 12

– Head and pronotum yellow, elytra reddish-yellow; ventral surface and legs largely brown. 8 mm. Western Texas (Davis Mountains) ..... *lineatus* Knull

12(11). Elytra expanded apically, surface moderately to finely punctate, the punctures less distinct toward apex 13

– Elytra subparallel, each tricostate, the costae prominent; punctures coarse and distinct from base to apex, pubescence sparse; thoracic and abdominal sterna largely black or piceous. 8-11 mm. Central Mexico (Guanajuato, Mexico) (typical subspecies); western Texas to southern Arizona and Durango (subspecies *davisi* Knull) ..... *luteus* Dugés

13(12). Elytra tricostate throughout; elytral base, epipleura, and femora rather densely clothed with much longer erect and suberect hairs than remainder of elytra. 8-10 mm. Mexico (Mexico) ..... *pallidus villosus* Linsley

– Elytra tricostate at base, quadricostate behind middle, the short costa less elevated; elytral base, epipleura and femora clothed with suberect hairs similar in length to those of remainder of elytra. 12-16 mm. Southern Arizona and northern Mexico (Chihuahua, Durango) ..... *ignitus* LeConte

14(10). Pronotum reddish-yellow or bicolored 15

– Pronotum black, disk very coarsely punctate except for an irregular median smooth area at base and an ante-median tubercle on each side. 9 mm. Mexico (Queretaro) ..... *scabricollis* Bates, var.

15(14). Pronotum with longitudinal yellow or reddish pubescent vittae 16

– Pronotum subglabrous, disk very coarsely, deeply punctate, ferrugineous with an oval black area at middle, sides depressed, black; elytra yellow, coarsely punctate, tricostate, innermost costa converging to suture near middle. 9 mm. Mexico (Queretaro, Hidalgo) ..... *dichromaticus* Linsley, ♂

16(15). Elytra dilated from in front of middle, disproportionately long, tricostate at base, quadricostate behind middle, the short costa less elevated; elytra reddish-yellow to fulvo-ochraceous 11-14 mm. Southern Arizona and New Mexico to Oaxaca, Mexico ..... *rufipennis* (LeConte)

– Elytra gradually and moderately dilated posteriorly, tricostate throughout, yellow in male, yellow or rufo-testaceous in female. 8-10 mm. Mexico (Durango, Mexico, Zacatecas, Guanajuato, Jalisco) ..... *pallidus* (Thomson)

Elytroleptus rufipennis (LeConte)

Pteroplatus rufipennis LeConte, 1884, Trans. Am. Ent. Soc., 12:23.

Elytroleptus longipennis Bates, 1885, Biologia Centrali-Americana, Coleoptera, 5:318 *(New Synonymy)*.

Elytroleptus eros Bates, 1885, Biologia Centrali-Americana, Coleoptera, 5:318, pl. 21, fig. 3 *(New Synonymy)*.

The above names apply to what appears to me to be a single species. The coloration of the elytra apparently varies

somewhat as in *E. pallidus* and the redder specimens are also subject to fading, judging by the types of *rufipennis* and *eros*.

Elytroleptus dichromaticus Linsley, new species

(Fig. 1)

Female: Head and prothorax rufo-testaceous, elytra lemon yellow with apices black, abdomen and femora and anterior tibiae, except bases and apices, pale rufo-testaceous, legs otherwise black, as are the antennae, a spot behind eye, anterior margin of prosternum, area surrounding anterior coxae, and a zigzag line from coxae to lateral margin and along margin posteriorly, mesosternum at middle, and metasternum. Head densely irregularly, moderately coarsely but shallowly punctate on upper frons and vertex, more finely punctate on lower frons; antennae not attaining middle of elytra, sulcate, coarsely punctate but shining, second, third and fourth segments shining, subcylindrical, remaining segments subopaque, heavier, fifth to tenth expanded at apex, subtriangular, serrate, fifth and sixth segments largest, sixth to eleventh abruptly decreasing in length. Pronotum subglabrous, a little wider than long, sides obtusely rounded, impressed above so as to give the effect of an elevated margin, disk flattened, very coarsely, closely punctate, more sparsely punctate sublaterally; prosternum almost impunctate in the concave antecoxal pale impression, confluently rugose in lateral black areas, meso- and metasterna finely punctate, thickly pubescent. Elytra relatively narrow, flaring slightly over apical half, tricostate, the costae distinct from base to apical dark area where they disappear, subparallel to one another but converging slightly toward the suture, surface shining except in apical dark area, very coarsely, closely punctate at base where there are only about three rows of punctures between the first two costae, becoming smaller posteriorly and increasing to about four rows near apical dark area, apical dark area covering between one-fifth and one-fourth of elytra, coarsely and very densely punctate, anterior margin transversely sinuate, apices narrowly separately rounded, not tuberculate, fringed with black hair. Abdomen with a few scattered coarse punctures and scattered long suberect hairs. Legs slender, femora sparsely punctate, sparsely pubescent. Length 10.3 mm.

Male: Sides of head, pronotal margins and center of disk black, elytra lemon yellow without an apical dark area, thoracic and abdominal sterna black. Length 9 mm.

Holotype female and allotype male (California Insect Survey, on deposit in California Academy of Sciences) from QUERETARO, QUERETARO, MEXICO, June 28, 1952 (E. E. Gilbert and C. D. MacNeill). A female specimen from Zimapan, Hidalgo, Mexico, June 11–14, 1951, taken on flowers of *Eysenhardtia polystachys* Ort. by P. D. Hurd differs slightly from the types in that the ground color of the elytra is somewhat rufo-testaceous rather than lemon yellow.

This species is very distinct in the flat, subglabrous, coarsely punctate pronotum. It is also remarkably dichromatic with regard

to the elytral pattern, the male elytra being concolorous, the female having black-tipped elytra. However, a male example of *E. scabricollis* Bates, taken in the company of a female with black-tipped elytra, also has the elytra concolorous yellow, although the males that I have seen from other localities are marked like the female.

Elytroleptus humeralis Linsley, new species

Male: Head, except vertex which is rufous, pro-, meso-, and metathorax, and antennae black, trochanters, femoral apices, tibiae, tarsi and scutellum black, dark area of elytra black with vaguely violaceous caste; pubescence long, erect, golden, except on elytra where it is short and antennae where it is black. Head densely and somewhat rugosely punctate on vertex, the punctures coarse but variable in size, area behind eyes rugose; antennae attaining middle of elytra, scape coarsely punctate but shining, segments two to four shining, slender, segments four to eleven subopaque, expanded apically, serrate, eleventh segment emarginate and more or less appendiculate. Pronotum a little wider than long, sides obtusely rounded but wider anteriorly, being narrowed toward base from just behind middle, lateral margin convex, feebly elevated, disk very coarsely somewhat confluently punctate, the punctures becoming smaller laterally but also dense; prosternum finely punctate, the punctures very dense at sides, meso- and metasternum, finely punctate, more densely so at sides. Elytra nearly three and one-half times as long as basal width, sides scarcely flaring apically, costae distinct over basal pale area, becoming narrower and inconspicuous over dark area, basal punctures much less coarse than those of disk of pronotum, pubescence short, obscure, anterior margin of apical dark area extending obliquely forward and reaching to basal one-fifth or one-sixth at suture, apices conjointly rounded, fringed with moderately short black hairs, not tuberculate. Abdomen coarsely not densely punctate, thinly clothed with long suberect hairs. Legs slender; femora punctate and thinly clothed with suberect hairs. Length 9.3 mm.

Female: Head and prothorax rufous, mesosternum and metasternum medially more or less rufo-testaceous; antennae extending over about basal one-third of elytra. Length 11.5 mm.

Holotype male, allotype female, and twenty paratypes (14♂♂, 6♀♀) from SALAICES, CHIHUAHUA, MEXICO, July 23, 1947 (H. Spieth, David Rockfeller Expedition, American Museum of Natural History) (two paratypes have been deposited in the California Insect Survey, University of California). Additional material in the collection of the American Museum of Natural History (David Rockefeller Expedition) is as follows: 2♂♂, 1♀, 20 miles southwest of Camargo, Chihuahua, 4,500 feet elevation, July 13, 1947 (M. A. Cazier, W. J. Gertsch, H. Spieth) and 1♂, 42 miles southwest of Camargo, 4,900 feet elevation, July 15, 1947 (M. A. Cazier).

This species is apparently related to *E. divisus* LeConte, but differs in the more elongate elytra with the pale area reduced largely to the humeral and lateral areas and bright rufo-testaceous rather than yellow and the basal area much less coarsely punctate than the pronotum. The two also differ in other details of color, the abdomen being black or piceous in *E. divisus* and only the posterior tibiae and apex of the intermediate tibiae are black.

Elytroleptus pallidus villosus Linsley, new subspecies

Similar in size and form to *E. pallidus pallidus* Thomson but differing in the very long, erect, flying hairs of the elytral epipleura and femora.

Holotype male, allotype female, and two paratypes, one of each sex, from Bejucos, Temescaltepec, Mexico, July 5, 1933 (H. E. Hinton and R. L. Usinger) (Calif. Acad. Sciences). An additional paratype, taken by the same collectors, is from Tejupilco, Temescaltepec, July 1933 (Calif. Acad. Sci.).

HOLOPLEURA MARGINATA LeConte

Holopleura marginata LeConte, 1873, Smithsonian Misc. Coll., 11(264):194.
Holopleura Helena LeConte, 1873, Smithsonian Misc. Coll., 11(264):194.

This species occurs from British Columbia to California. It is extremely variable in color and size. The basic coloration is black with the head, pronotum and elytra coccineus with variably extensive black markings. The female is the more reddish of the two sexes, the dark areas of the elytra often being reduced to a broad discal band or an oblique bar at basal one-third and a lateral dot at apical one-third.

SEDIS INCERTAE

"PTEROPLATUS" METALLICUS Nonfried

Pteroplatus metallicus Nonfried, 1894, Ent. Nachr., 20:140.
Elytroleptus metallicus, Aurivillius, 1912, Coleopterorum Catalogus, 39:456.

I have not been able to apply this name to any of the material available for study. Judging from the original description, the species involved does not appear to be *Pteroplatus*, where it was placed by its author, nor *Elytroleptus*, where it was assigned by Aurivillius. Proper interpretation may have to await a re-examination of the type specimen, which is from Central Honduras.

BOOK REVIEW

BEES OF THE EASTERN UNITED STATES. Volume 1. By Theodore B. Mitchell. Published by The North Carolina Agricultural Experiment Station with support from the National Science Foundation. Technical Bulletin No. 141, pp. 1-538, 134 figs., June 1960. Price $10.00.

This work is the culmination of many years of critical study of the native bee fauna of the United States east of the Mississippi River. It includes a systematic account covering approximately one-half the total number of native bees in that area (464 species and subspecies, 90 of which are new to science). The families treated in this first volume are the Colletidae, Andrenidae, Halictidae, and Melittidae.

The introductory account contains much useful information concerning collecting techniques, preparation of specimens, taxonomic methods, morphological and ecological considerations. In addition to keys to the families and genera, the work also includes keys to the species. Each treatment of a species contains biblographic references, diagnostic descriptions, floral and distributional data. Throughout the work the value of the source materials, especially the incorporated results of type studies, is prominently evident. Comparatively few type specimens were either unavailable for study or were not located during the course of investigation.

In general, the classification reflects a conservative approach, but significantly the systematic treatment of the family Halictidae differs from recent classifications in that some groups (*Dialictus, Evylaeus, Paralictus,* etc.) are accorded generic rank. These modifications are in keeping with the developing knowledge of the world fauna of Halictidae.

The study is profusely illustrated with line and shaded drawings of various structural features (heads, genitalia, wings, sternal plates, etc.)

Unquestionably, Professor Mitchell has produced a work of scholarly achievement which is not only indispensable to the needs of bee specialists, but also to anyone with an interest in the native bee fauna of the eastern United States. Completion of this work will insure a foundation for the development of future critical studies on this and other faunal areas.—P. H. Timberlake and P. D. Hurd, Jr., *University of California, Riverside and Berkeley.*

A REVIEW OF THE GENUS ARPHNUS STÅL WITH A NEW SPECIES FROM MEXICO

(Hemiptera: Lygaeidae)

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The genus *Arphnus* (Cyminae, Cymini) was proposed by Stål (1874) for *Oxycaraenus* [*sic*] *coriacipennis* Stål, 1859, described from San Francisco, California. In 1929 Van Duzee described two additional species: *A. tristis* from Sparks, Nevada, and *A. profectus* from Laguna Mountain, San Diego County, California, and gave a key for the three species. A fourth species, *A. tripunctatus*, which was collected on Isabel Island, Nayarit, Mexico, was described by Van Duzee in 1933.

Arphnus is very closely related to the cosmopolitan genus *Cymus*, and is distinguished solely by its greatly extended tylus or clypeus (Fig. 4). This seems to me to be a weak generic character. and some future reviser of generic concepts in the Cymini may feel justified in placing *Arphnus* Stål as a synonym of *Cymus* Hahn. For the purposes of this paper, however, the present concept provides a convenient unit for discussion.

When Van Duzee described *A. tristis* and *A. profectus*, he wrote, "the . . . two forms should, perhaps, be considered as geographical races . . ." of *A. coriacipennis*. Distinguishing the three species has troubled hemipterists, including myself, since usable characters are practically nonexistent. These two species of Van Duzee's are here considered to be synonymous with Stål's species *A. coriacipennis*. *A. tripunctatus* Van Duzee is distinct, and a new, related species is described from specimens in the U. S. National Museum which were intercepted in quarantine from Mexico, usually on orchids. The following key separates the three species left in the genus.

KEY TO THE SPECIES OF ARPHNUS STÅL

1. Width of eye as seen from above about one-half width of clypeus at apex of jugae (Figs. 1, 3); antennal segment II two-thirds length of segment III; (Mexico, Central America) 2
– Width of eye as seen from above nearly equal to width of clypeus at apex of jugae (Fig. 2); antennal segment II four-fifths length of segment III; (western U. S.) ..... *A. coriacipennis* (Stål)
2. Apex of clypeus, and antennal segment IV, black (Fig. 3); posterior margin of prothorax slightly emarginate before scutellum ..... *A. melanotylus* Ashlock

– Apex of clypeus, and all antennal segments, pale (Fig. 1); posterior margin of prothorax straight.....*A. tripunctatus* Van Duzee

ARPHNUS CORIACIPENNIS (Stål) (Figs. 2, 4)

Oxycaraenus [*sic*] *coriacipennis* Stål, 1859. Kong. Svenska Freg. Eugenies resa omkring jordan, 3: 247.

Arphnus coriacipennis (Stål), 1874. Enum. Hemip., 4: 126.

Arphnus tristis Van Duzee, 1929. Pan-Pacific Ent., 5: 189–190. *(new synonymy).*

Arphnus profectus Van Duzee, 1929. Pan-Pacific Ent., 5: 190. *(new synonymy).*

The wider eyes (Fig. 2) distinguish this species from the other two species in the genus. It has been collected in California, Oregon, Washington, Nevada, Utah, and New Mexico.

On July 2, 1954, I collected what at the time appeared to be two species of this genus at Simpson Spring, Simpson Mountain (near Dugway Proving Ground), Tooele County, Utah. Both were swept from *Juncus balticus*; but one, with a black head, prothorax, and abdomen, was found only on plants growing in the moving water of the spring while the other, a pale form, occurred only on plants growing a few feet away on dry land. Nymphs were abundant in both habitats; those on plants in the spring had black heads and thoraces while those on plants growing on dry soil were entirely pale.

This unusual situation made me curious to see how these specimens fit the characters used by Van Duzee in his key. To help discussion this key is reproduced here.

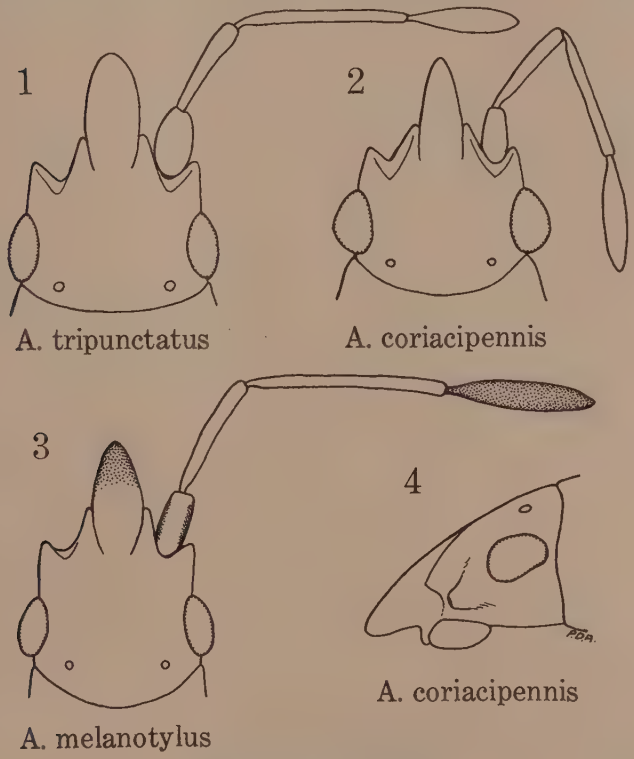
KEY TO WESTERN SPECIES OF APHNUS STÅL
from E. P. Van Duzee, 1929, pp. 188–189

1. Tylus short produced before the bucculae for a distance scarcely more than hlaf the length of the bucculae; head, pronotum and abdomen blackish piceus.....*tristis* n. sp.
– Tylus longer, produced before the bucculae for a distance fully equal to the length of the bucculae; color paler, the head and pronotum sometimes piceus..... 2
2. Tylus attaining middle of antennal segment II; median carina of pronotum obsolete behind the middle; membrane hyaline or faintly smoky; femora usually concolorous.....*coriacipennis* Stål
– Tylus attaining apical third of antennal segment II; membrane with a longitudinal median cloud; color pale, femora piceus.....*profectus* n. sp.

According to Van Duzee's key, dividing the length of the bucculus into the length of the tylus or clypeus should produce a ratio of slightly more than 0.5 for *A. tristis* and of 1.0 for *A. coriacipennis* and *A. profectus*. However, 20 specimens of the

black form from the Simpson Spring series ranged from 0.83 to 1.09 (average: 0.95), while 22 specimens of the pale form from the same locality ranged from 0.83 to 1.25 (average: 1.01). The great overlap present made distinguishing "species" impossible.

Measurements were also taken from the type series of Van Duzee's two western species. For *A. tristis* (7 specimens including the holotype) ratios ranged from 0.75 to 1.09 and averaged 0.89; for *A. profectus* (also 7 specimens including holotype) ratios ranged from 1.08 to 1.36 and averaged 1.21. A series of 8 specimens with dark heads and prothoraces from Inverness, Marin



EXPLANATION OF FIGURES

Figs. 1–3, Dorsal view of head of *Arphnus* species; 1. paratype; 2. Marin Co., California; 3. holotype; Fig. 4, lateral view of head showing clypeus, labium omitted.

County, California (about 25 miles north of San Francisco, type locality of *A. coriacipennis*), had ratios ranging from 0.91 to 1.17, averaging 1.04. A series of 11 specimens of the pale form from Corvallis, Oregon, had ratios ranging from 0.77 to 1.08, averaging 0.91.

Evidently the clypeus-bucculus ratio tends to be clinal, lower in the north and higher in the south. Van Duzee was misled because he compared populations from widely separated localities.

The other characters used in Van Duzee's key break down even more easily. Because most of the variation in the ratios discussed above was caused by variation in the clypeal length, the first part of the second couplet is rendered unworkable. The median carina of the pronotum, mentioned only in the first half of the second couplet, is present in all specimens of the species, but becomes an impunctate line posteriorly; it is very difficult to tell where it ends. The pigmentation of the membrane is very slight in all specimens and takes the form of a longitudinal stripe.

The color differences among various populations are more difficult to explain. Van Duzee's key seems to indicate three different color groups: *A. tristis* with black head and prothorax, *A. coriacipennis* with slightly paler head and prothorax, and the pale *A. profectus*. Actually only the *A. profectus* form is distinct, since the *A. tristis* and *A. coriacipennis* color forms grade completely into one another.

One might be tempted to regard *A. profectus* as a separate species even though there are no morphological characters available to separate it from *A. coriacipennis*. However, the fact that the two forms can live on the same host plant species within a few feet of one another seems to contradict this possibility. It would probably be more logical to assume that the color differences are the result of a physiological response to a single host plant in different environments.

A direct relationship between the color of the insect and the wetness of the host plant's habitat cannot be implied. I have collected the pale form alone at a locality in Utah County, Utah, where the host plant grew in running water, and the darker form in various localities near San Francisco, California (this group includes the ones from Inverness mentioned above), from host plants growing on dry land. Ground water salinity may control

the color of the insect; perhaps some other factor produces the variation.

Since these insects fly readily, the complete separation of color forms encountered at the Simpson Spring locality in Utah is rather strange. The abundance of nymphs found, however, indicates that July 2, the collection date, may have been early in the season for the species. Some valuable observations might be made by someone who found a situation similar to this in a more accessible locality. If the populations become more and more mixed as the summer progresses, and especially if matings could be observed between the darker and the paler forms, then the above proposed explanation for the occurrence of two color forms would be considerably strengthened.

ARPHNUS TRIPUNCTATUS Van Duzee (Fig. 1)

Arphnus tripunctatus Van Duzee, 1933. Proc. California Acad. Sci., (4) 21: 36.

This species and the following are easily distinguished from the more northern *A. coriacipennis* by their narrower eyes. The pale clypeus will immediately separate *A. tripunctatus* from its nearest relative described below. The name *tripunctatus* is apparently derived from the tiny spots at the apices of the clavi and coria. These are found on all three species of the genus.

A. tripunctatus has been reported only from its type locality, an island off Nayarit, Mexico. The U.S. National Museum, however, has specimens collected in 1905 by Frederick Knab from Champerico, Guatemala, and Puntarenas, Costa Rica, all on the Central American mainland.

Arphnus melanotylus Ashlock, new species

(Fig. 3)

Head: length 0.82 mm., width 0.60 mm., interocular space 0.40 mm.; eye, viewed dorsally, half as wide as long, width 0.10 mm., length 0.20 mm., and about half as wide as clypeus at apex of jugae; bucculae 0.22 mm.; antennal segment II two-thirds length of III, subequal to IV, lengths: I, 0.20 mm.; II, 0.37 mm.; III, 0.58 mm.; IV, 0.42 mm.; labium nearly reaching middle coxal cavities, segment I reaching middle of eye, segment lengths: I, 0.40 mm.; II, 0.31 mm.; III, 0.27 mm.; IV, 0.24 mm. *Prothorax:* gradually narrowed anteriorly, slightly wider posteriorly than long, anterior width 0.53 mm., posterior width 0.88 mm., length 0.80 mm.; median carina disappearing in posterior two-thirds; posterior margin slightly emarginate. *Scutellum:* width 0.42 mm., length 0.26 mm., shorter than claval commissure, length 0.53 mm. *Hemelytron:* with corium slightly longer than membrane, corium 1.79 mm., membrane 1.61 mm., basal portion of membrane nearly twice length of apical portion, length from base to level of apices of coria

1.06 mm., length from apices of coria to apex 0.57 mm. *Color:* light brownish-yellow except the following: apex of clypeus beyond jugae, basal segment (except a pale dorsal longitudinal stripe) and terminal segments of antennae, and apices of coria, black; apices of clavi, brown; scutellum slightly darker than hemelytra; legs with basal two-thirds of fore- and middle-femora and basal two-thirds of posterior surface of each hind leg, brown; abdomen ventrally with a brown sublateral stripe from base to segment IV, segment VII pale.

Length, 4.1 mm., width, 1.1 mm. (Range, males: length 3.5–4.4 mm., width, 1.0–1.3 mm.; females: length, 4.1–4.3 mm., width, 1.1–1.3 mm.).

Holotype male. GUERRERO, MEXICO, intercepted at Laredo, Texas, February 28, 1959, on orchid plants (U.S.N.M. Type No. 64855).

Paratypes: Mexico: 1♀, same data as type; 1♂, same data but III-4-1946; 1♂, San Blas, Nayarit, intercepted on orchid at Nogales, Arizona, IV-2-1957 by Noel and Alexander; 1♂, Huichuican, San Luis Potosi, intercepted at Laredo, Texas, XII-21-1951 on *Tillandsia* plants; 1♂, Tamazunchale, San Luis Potosi, intercepted at Laredo, Texas, IV-3-1946; 1♂, Jalapa, Veracruz, intercepted at Laredo, Texas, VIII-13-1945 on orchid plants; 1♂, Fortin, Veracruz, intercepted at Laredo, Texas, XI-6-1952 on orchids; 1♂, 1♀, same date, intercepted II-23-1954; 1♂, same data, but no date; 1♂, Chaverillo (Chavarillo?), Veracruz, intercepted at Laredo, Texas, V-28-1946 on orchid plants; 1♀, Veracruz, II-14-1955 on orchid plants; 1♀, Veracruz, intercepted at Laredo, Texas, X-13-1959 on bromeliads; 2♂, Tuxtla Gutierrez, Chiapas, intercepted at Laredo, Texas on orchid plants, no date; 1♂, same data, III-27-1952; 1♀, Mexico, in pineapple, intercepted at Brownsville, Texas, V-4-1937; 1♀, origin ?, intercepted at Laredo, Texas, I-19-1946 on bromeliads.

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FOUR NEW SPECIES OF MAYETIA FROM WESTERN NORTH AMERICA

(Coleoptera: Pselaphidae)

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Four new species of *Mayetia* are described in this paper. Three are from California and one is from Oregon. They are of the typical western form, lacking the gross sensory organs of the maxillary palpus and possessing integumental projections anterior to the paired setae of the mentum. They are remarkably similar to each other and to those species previously described from California, differing mainly in the genital structures.

The holotypes are deposited in the collection of the California Academy of Sciences; the paratypes are retained by the author.

Mayetia putahensis Schuster, new species

(Fig. 1)

Male.—(slide) Head 121μ long × 121μ wide; pronotum 131μ long × 114μ wide; elytra 124μ long; sternite VI 63μ long, the notch 17μ (fig. 1b); Total length 1,075μ. Aedeagus 156μ long × 100μ wide × 20μ thick (fig. 1a). In this species, and in those following, the pro- and mesotrochanter of the male are simple and the metatrochanter is spined on the inner posterior margin.

Female.—Resembles male except: Tergite VI 141μ long × 114μ wide with internal markings as illustrated in figure 1e; sternite VI not emarginate.

The *holotype male*, one male and three female paratypes were collected from the bank of a small tributary to PUTAH CREEK, 5.4 MILES SOUTHWEST OF WINTERS, YOLO COUNTY, CALIFORNIA, on April 23, 1959 by F. C. Raney. One additional female paratype was collected at the same locality on January 17, 1960 by Leslie M. Smith and R. O. Schuster.

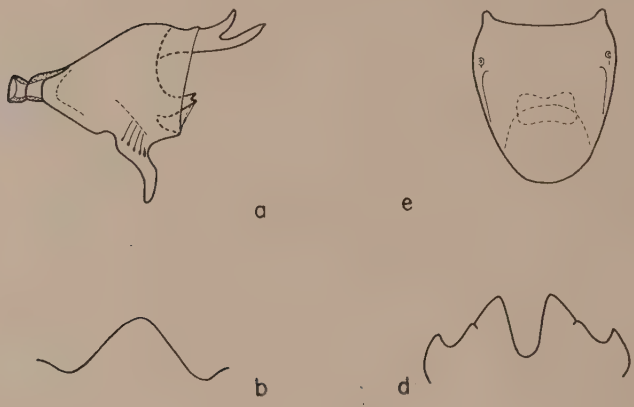
The broadly expanded apex of the aedeagus distinguishes the males of this species, and the characters of the ultimate segment of the abdomen identify the females.

Mayetia grayae Schuster, new species

(Fig. 2)

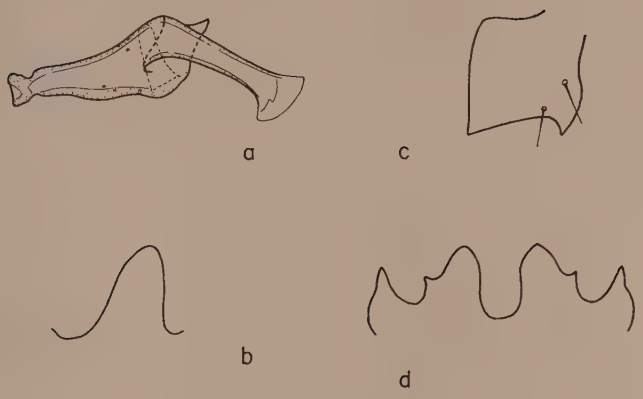
Male.—(slide) Head 120μ long × 120μ wide; pronotum 130μ long × 100μ wide; elytra 118μ long; sternite VI 87μ long, the notch 17μ (fig. 2b); total length 1,075μ. Aedeagus 191μ long × 67μ wide × 12μ thick (fig. 2a).

Female.—Resembles male except: Tergite VI 158μ long × 110μ wide with internal design as illustrated in figure 2e; sternite VI not distally emarginate.

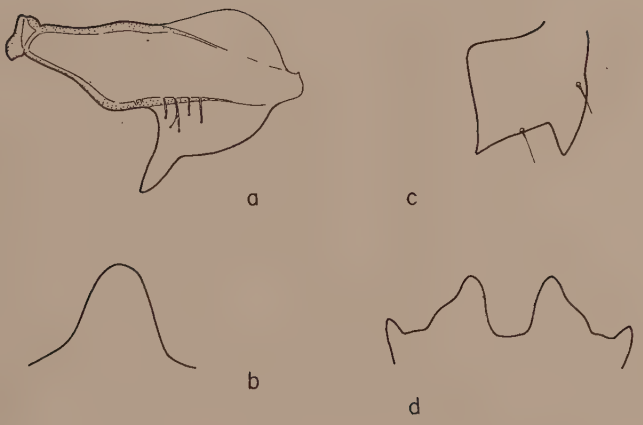


EXPLANATION OF FIGURES

Fig. 1, *Mayetia putahensis* Schuster; fig. 2, *Mayetia grayae* Schuster; a. aedeagus, b. emargination of sternite VI, c. metatrochanter, d. distal margin of labrum of male, e. ultimate abdominal segment of female.



3 judsoni



4 smithi

EXPLANATION OF FIGURES

Fig. 3, *Mayetia judsoni* Schuster; fig. 4, *Mayetia smithi* Schuster; a. aedeagus, b. emargination of sternite VI, c. metatrochanter, d. distal margin of labrum of male, e. ultimate abdominal segment of female.

The *holotype male*, one male and four female paratypes were collected at FORT ROSS, CAZADERO TOWNSHIP, MARIN COUNTY, CALIFORNIA, on April 26, 1959 by Alice Gray. They were recovered from samples taken 0 to 8 inches and 8 to 12 inches under sod.

The uniformly slender aedeagus with a broadly rounded apical termination superficially resembles the genitalia of *M. fistula* Schuster, Marsh and Park. However, the lateral projection on this structure appears nearly at right angles to the remainder of the aedeagus and is not so closely associated with the apex as is the case with *M. fistula*. The aedeagus of *M. grayae* is nearly 50μ longer than that of *M. fistula*. The relatively long ultimate segment of the abdomen of the female and its internal markings identify the female.

Mayetia judsoni Schuster, new species

(Fig. 3)

Male.—(slide) Head 135μ long × 140μ wide; pronotum 148μ long × 130μ wide; elytra 135μ long; sternite VI 76μ long, the notch 23μ (fig. 3b); total length 1,150μ. Aedeagus 168μ long × 20μ wide × 12μ thick (fig. 3a).

Female.—Unknown.

The holotype male and four male paratypes were collected ONE MILE WEST OF BOLINAS, MARIN COUNTY, CALIFORNIA, on January 19, 1960 by C. L. Judson. The specimens were recovered from litter and soil under cypress.

The shape of the aedeagus superficially resembles that of *M. scobina* Schuster, Marsh and Park. The apex of this structure is fan-shaped for *M. judsoni* and acute for *M. scobina*. The large, scaled process opposite the normal lateral development is the most obvious identifying structure for *M. scobina*. In *M. judsoni* the scales are absent, and the process is nearly obsolete.

Mayetia smithi Schuster, new species

(Fig. 4)

Male.—(slide) Head 135μ long × 135μ wide; prontum 145μ long × 118μ wide; elytra 135μ long; sternite VI 84μ long, the notch about 20μ (fig. 4b); total length 940μ. Aedeagus 168μ long × 118μ wide × 15μ thick (fig. 4a).

Female.—Unknown.

The *holotype male* was collected 2.7 MILES NORTH OF LOON LAKE, DOUGLAS COUNTY, OREGON, July 2, 1959 by Leslie M. Smith.

The aedeagus of this species resembles that of *M. fistula*, but

that species lacks the thin rounded lamella opposite the normal lateral development and has a much more linear appearance than does the aedeagus of *M. smithi*.

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ZOOLOGICAL NOMENCLATURE: NOTICE OF PROPOSED USE OF PLENARY POWERS IN CERTAIN CASES (A.[N.S.]46)

In accordance with a decision of the 13th International Congress of Zoology, 1948, public notice is hereby given of the possible use by the International Commission on Zoological Nomenclature of its plenary powers in connection with the following cases, full details of which will be found in *Bulletin of Zoological Nomenclature*, Vol. 18, Parts 1–3 to be published on 5 December 1960.

(1) Suppression of 56 generic names published by Meigen, 1800 (Insecta, Diptera) (Z.N.[S]191)

(4) Validation of the generic name *Myelophilus* Eichhoff, 1878 (Insecta, Coleoptera) (Z.N.[S.]467)

(5) Suppression of the specific name *couchii* Kent, 1883 (*Lepidogaster* [sic]) (Z.N.[S.]1330)

(7) Designation of a type-species for *Euceraphis* Walker, 1870 (Insecta, Hemiptera) (Z.N.[S.]1363)

(9) Validation of the generic name *Perla* Geoffroy, 1762 (Insecta, Plecoptera) (Z.N.[S.]1451)

Any zoologist who wishes to comment on any of the above cases should do so in writing, and in duplicate, as soon as possible, and in any case before 5 June 1961. Each comment should bear the reference number of the case in question. Comment received early enough will be published in the *Bulletin of Zoological Nomenclature*. Those received too late for publication will, if received before 5 June 1961, be brought to the attention of the Commission at the time of commencement of voting.

All communications on the above subject should be addressed as follows: The Secretary, International Commission on Zoological Nomenclature, c/o British Museum (Natural History), Cromwell Road, London, S.W. 7, England—W. E. CHINA, *Assistant Secretary, International Commission on Zoological Nomenclature.*

A NOTE ON THE LIFE HISTORY OF PANSCOPUS TORPIDUS (LECONTE)

(Coleoptera: Curculionidae)

E. P. BREAKEY[1]

Early in April 1953, a farmer in the Puyallup Valley reported weevils were eating the foliage of young raspberry plants. This report was of more than usual interest for several reasons: the appearance of adult weevils in destructive numbers so early in the year, their presence in a field where no raspberries had been grown for the past several years, and the fact that they were obviously not the raspberry bud weevil, *Nemocestes incomptus* (Horn), a pest infrequently troublesome in the area. When attempting to acount for the presence of the weevils, it was learned the field had been in grass the past several years and had also supported a considerable number of red clover plants. Since the adult beetles were unable to fly, they must have originated in the field where they were to be found in large numbers on the young raspberry plants.

More than 100 living weevils were taken from the raspberry plants on or before April 23. Some were killed and sent to the Insect Identification and Parasite Introduction Section, Entomological Research Branch, Agricultural Research Service of the United States Department of Agriculture for identification. On May 7, Mr. C. F. W. Muesebeck reported they had been identified by Miss R. E. Warner as *Panscopus torpidus* (LeConte). This weevil had been reported to be "fairly common" in strawberry fields in Washington (Baker, 1930), and had been reported to be a potential pest of the strawberry in Oregon (Wilcox, *et al.*, 1934).

Acting on the possibilities of these observations, 90 living specimens were distributed evenly over strawberry plots that had been established recently for determining the relative effectiveness of certain insecticides in the control of the strawberry root weevils (Breakey, 1959). Later, the plots were also "seeded" with weevils belonging to the *Brachyrhinus* group. Apparently, the *Panscopus* weevils failed to become established on the strawberries. None

[1]Entomologist, Washington Agricultural Experiment Stations, Western Washington Experiment Station, Puyallup, Washington. Scientific Paper No. 1936. Project No. 1371.

was ever recovered from the plots. Moreover, none was found in the untreated checks when taking data at the conclusion of the tests.

Adults of *P. torpidus* (LeConte) were present in destructive numbers in certain raspberry fields again in 1959. Many living specimens were taken on March 27. A number of these were placed in a suitable cage and supplied with raspberry leaves for food. They were voracious feeders, and some began laying eggs very soon after being placed in the cage. Working on the upper surface of the raspberry leaf, the female placed her eggs loosely in "pleats" or folds she made in the leaf. The pleats were closed by the female to secure the eggs and fastened with an adhesive-like substance. When a pleat was forcefully opened, the adhesive would stretch out into strands or "threads" that were quite elastic. It was almost as if the female had closed the pleats by sewing, making the stitches well above the row of eggs in the bottom of the fold to avoid injuring them. Such leaves had so many folds or pleats they had developed an unnatural elongated appearance. It was this unnatural appearance that prompted a more than cursory examination of such leaves.

Each egg was white, cylindrical, straight and about twice as long as its greatest diameter. The eggs began hatching soon after they were laid. The young larvae, upon escaping from the "pleats," dropped to the floor of the cage. Presumably, under natural conditions, they would drop to the ground and enter the soil.

Unfortunately, when additional weevils were sought for continuing and perhaps expanding the studies, none could be found. The farmers had applied insecticides in those fields known to be infested, and a search for weevils in other fields failed to produce any. Many years experience with certain *Brachyrhinus* weevils, all of which are of exotic origin, had made us familiar with the egg-laying habits of that group. These weevils always deposited their eggs indiscriminately on or in the soil near the host plant. So did those of certain *Dyslobus* species, a group that is indigenous to western North America, some of which are important pests of the strawberry. By contrast, the egg-laying habits of *P. torpidus* (LeConte) are novel and invite further study. *Panscopus torpidus* was described by LeConte in 1857 from "Oreg.," and it too is indigenous to this area.

The growers were of the opinion the weevils found on their plants were the raspberry bud weevil, *Nemocestes incomptus* (Horn). However, the weevils differ so much structurally and in general appearance, it is doubtful if an entomologist would mistake one for the other. The two species have these things in common while differing materially in others: both feed on the foliage of the red raspberry. Our records show that *Nemocestes* weevils have been taken every month from April until November but *Panscopus* weevils have been taken only in March and April.[2] Both will lay their eggs on raspberry leaves. *Nemocestes* weevils cement their eggs to the undersides of the leaves in neat rows, while those of *Panscopus* are laid in the manner described above. Eide (1955) found *Nemocestes* grubs in a strawberry field while we failed to infest a strawberry planting with *Panscopus*.

We are indebted to Prof. Melville H. Hatch of the University of Washington for the following records of *P. torpidus* (LeConte) as they apply to this area. Olympia, Washington and Portland, Oregon (Pierce, Proc. U.S. Natl. Mus. 45:392, 1913); Seattle, Washington, May 17 and June 2, 1933, named by W. W. Baker in 1936; Seattle, Washington 1924 (probably April 9) and 1939 (probably April 22). The Seattle specimens are in the University collections. None of these records indicates that *P. torpidus* (LeConte) was then considered of economic importance.

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Wilcox, J., D. C. Mote and L. Childs

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[2] Professor Melville H. Hatch, University of Washington, has provided two later dates: May 17, 1933 and June 2, 1933. Both are from specimens that were taken in or near Seattle.

NEW DIANDRENA ASSOCIATED WITH OENOTHERA AND NOTES CONCERNING OTHER SPECIES

(Hymenoptera: Andrenidae)

E. G. LINSLEY AND J. W. MACSWAIN[1]

University of California, Berkeley

The andrenine subgenus *Diandrena* includes bees important in the pollination of plants of the family Onagraceae. In connection with studies of their behavior and ecology, a number of new species and subspecies were encountered and descriptions of several of these are offered in order that the names may be available for use elsewhere. In order to properly place the new species, it was necessary to examine the types of the previously named forms and to consider certain other species which, although not associated with Onagraceae, are important from the standpoint of the evolution of flower specificity in the group. Synonymical and descriptive notes concerning these are also included.[2]

CHALYBIOIDES GROUP

ANDRENA (DIANDRENA) CHALYBIOIDES (Viereck)

Parandrena chalybiodes Viereck, 1904, Canadian Ent., 36:229, ♀ ♂.

Andrena (Parandrena) perchalybea Viereck, 1916, Proc. Acad. Nat. Sci., Philadelphia, 68:591, ♀. *New synonymy*

Examination of the type specimens upon which the two Viereck names were based reveals that they both represent the same species. The type of *chalybioides* is from Washington Territory, that of *perchalybea* from Corvallis, Oregon. The female has dark brown or blackish facial pubescence, mostly pale thoracic pubescence, and pale abdominal pubescence. The labral process is bilobed, the propodeal enclosure finely rugulose without distinct longitudinal ridges at base, and the mesocutal punctures are mostly separated by about two diameters. The tibial scopa is plumose and adapted for the collection of pollen from Compositae.

ANDRENA (DIANDRENA) SUBCHALYBEA Viereck

Andrena (Parandrena) subchalybea Viereck, 1916, Proc. Acad. Nat. Sci., Philadelphia, 68:593, ♀.

This species is very similar to the preceding, but the females differ in the form of the process of the labrum, which is narrower in *subchalybea* and has smaller lobes, and in the sculpturing of

[1] The research reported here was supported by a grant from the National Science Foundation.

[2] The authors are indebted to P. H. Timberlake, University of California, Riverside, for the loan of critical material and aid in the study of several of the bees reported here, and to Peter H. Raven, Rancho Santa Ana Botanic Garden, Claremont, California, for assistance in making collections and for identifying the species of *Oenothera*.

the propodeal enclosure, which is distinctly but finely, longitudinally ridged at base. The two species have a similarly plumose scopa and *A. (D.) subchalybea* also collects its pollen from Compositae. We have a series of females from Lockwood Valley, near Stauffer, Ventura County, California, May 3, 1959 (P. D. Hurd, G. I. Stage and J. R. Powers) which were taking pollen from *Agroseris sp.* We do not have the male of *chalybioides* for comparison, but the male of *subchalybea* has an unusual process of the labrum, which is somewhat spoon-shaped, with the sides elevated, polished, and straight but slightly converging.

Andrena (Diandrena) subchalybea chlorosoma

Linsley and MacSwain, new subspecies

Female and male.—Integument dull, rather than shining, as in the nominotypical subspecies, and the basal longitudinal rugae of the enclosure of the propodeum better developed, length, approximately 9 mm., ♀; 7.5 mm., ♂; anterior wing, ♀ 7 mm., ♂ 6 mm.

Holotype female (California Academy of Sciences, Entomology) from BERKELEY, CALIFORNIA, April 2, 1954, at flowers of *Ranunculus californica* (but not collecting pollen) (J. W. MacSwain); allotype male (California Academy of Sciences, Entomology), same locality, April 2, 1954, (J. W. MacSwain); and 85 paratypes, (California Insect Survey) same locality as follows:

Nineteen females between March 27 and April 30, 1954 taking nectar from *Ranunculus californicus* (J. W. MacSwain); 2 females April 1, 1956 (J. W. MacSwain); 1 female April, 1935 (G. E.:R. M. Bohart); 55 males between March 22 and April 9, 1954 mostly taking nectar from *Ranunculus californicus* (J. W. MacSwain); 1 male April 16, 1954 (H. L. Hansen); 5 males April 1, 1956 (J. W. MacSwain); and 2 males April 11 and 12, 1937 (G. E.:R. M. Bohart).

This is the form previously referred to by us as *A. (D.) purdyi* Cockerell (Linsley and MacSwain, 1959, Univ. Calif. Publ. Ent., 16(1):18), but an examination of the unique male type of the Cockerel species reveals that the two are not the same. Although this subspecies also looks superficially different from the typical *subchalybea* from southern California, the characters involved appear to represent differences of degree. We have adopted a name suggested by P. T. Timberlake.

ANDRENA (DIANDRENA) ABLEGATA (Cockerell)

Diandrena ablegata Cockerell, 1922, Amer. Mus. Novitates, 40:1, ♀.

This species is closely related to the preceding. In the female material which we have seen the facial pubescence is a mixture of dark and pale hairs, the body pubescence pale, and the tibial

scopa plumose, being adapted for the collection of pollen from Compositae. The propodeal enclosure is coarsely, irregularly rugulose, the labral process distinctly notched, and the mesoscutal punctures mostly separated by a single diameter or less. The examples which we have seen are all from Wyoming.

ANDRENA (DIANDRENA) NOTHOCALAIDIS (Cockerell)

Diandrena nothocalaidis Cockerell, 1905, Proc. Biol. Soc. Washington, 18:183, ♀ ♂.

A. (D.) nothocalaidis is closely related to *chalybioides* and *ablegata*, the female differing from both in the deeply divided process of the labrum and the less dense punctation of mesoscutum (a high percentage of the punctures separated by three diameters or more). From *chalybioides* it further differs in the coarsely, irregularly rugulose enclosure of the propodeum and from *ablegata* by the black facial pubescence. We have only one example, from Boulder, Colorado. The plumose scopa is appropriate for the collection of pollen from Compositae.

Andrena (Diandrena) evoluta

Linsley and MacSwain, new species

Female.—Integument dark blue, elevated portions of abdominal tergite greenish, basal antennal segments black, apical two-thirds of flagellum reddish-brown beneath; pubescence black or dark brown except for the long pollen-holding hairs of the outer or ventral surface of the posterior femora and tibiae and a somewhat lunular row of long erect hairs at base of metasoma. *Head* tessellate and moderately densely punctate but shining; clypeus without a median impunctate line; labrum with apex of process deeply incised and bilobed, the lobes elevated, polished and separated. *Mesosoma* with mesoscutum very feebly shining, minutely tessellate, the superimposed punctures separated by from one to three diameters; mesoscutellum and metanotum similarly sculptured but the latter more densely punctate; propodeum tessellate and rugosopunctate, the basal enclosure regularly, longitudinally ridged; wings tinted with pale brownish; posterior legs with tibial scopa composed of moderately long, apically directed hairs, outer dorsal portion of scopa about as wide as tibia, plumosity of hairs unilateral, or occasionally bilateral with both branches directed in the same direction, elongate, suberect and often recurved apically. *Metasomal* terga rather uniformly sculptured over basal elevation and apical depression. Length, approximately 9 mm., anterior wing, 6.5 mm.

Holotype female (California Academy of Sciences, Entomology) from 6.5 MILES NORTH OF TERMO, LASSEN COUNTY, CALIFORNIA, June 21, 1959, collecting pollen from *Oenothera tanacetifolia* between 7:45 and 8:00 a.m. P.S.T.[3] (G. I. Stage). Paratypes (California Insect Survey) 16 ♀♀, same locality and date, between

6:30 and 8:30 a.m. (G. I. Stage) (all bearing *Oenothera* pollen on the tibial scopa or femoral floccus but only a few with pure pollen loads); 11 ♀♀, same locality, June 9 to 11, 1960, most collecting pollen from *Agoseris glauca* (G. I. Stage and R. W. Thorp); 16 ♀♀, same locality, June 23, 1960, most collecting pollen from *Agoseris glauca* (J. W. MacSwain); 14 ♀♀, 5.5 and 7 miles north of Termo, June 23, 1960, all on *Agoseris glauca* (J. W. MacSwain); and 8 ♀♀ from 2 miles north of Ravendale, Lassen County, California, June 10, 1960, most collecting pollen from *Agoseris glauca* (G. I. Stage). Other specimens which appear assignable to this species but are not designated as paratypes are 46 females from 2.5 miles east of Austin Summit, Lander County, Nevada on June 6, 1960 (E. G. Linsley and J. W. MacSwain). Most were gathering pollen from the introduced common dandelion, *Taraxacum officianale.*

The female of this species differs from those of the three preceding in the form of the tibial scopa and the nature of the hairs which comprise it and also in the sculpturing of the basal enclosure of the propodeum, which is regularly, longitudinally ridged. It appears to be closest to *A. (D.) nothocalaidis* (Cockerell).

Andrena (Diandrena) apasta Linsley and MacSwain, new species

Female.—Integument dark violaceous blue, antennae black; pubescence predominantly dark, that of face blackish, of thoracic dorsum dark brown with some pale hairs posteriorly, of abdomen dark brown and much longer on first two metasomal tergites than on third and following. *Head* densely punctate but shining, especially below antennal insertions; clypeus without a median impunctate line; labrum with apex of process very shallowly emarginate, the angles broadly rounded. *Mesosoma* with mesoscutum feebly shining, minutely tessellate, the superimposed punctures mostly separated by from two to three or more diameters; mesoscutellum and metanotum similarly sculptured but more densely punctate; propodeum tessellate and punctate, the basal enclosure coarsely, irregularly rugulose, posteriorly, more regularly at base; wings lightly tinted with brownish; posterior legs with tibial scopa composed of long, coarse hairs mostly from 2.5 to 3 times as long as width of tibiae, those of inner (ventral) surface, simple with apex slightly recurved, those of outer (dorsal) margin less coarse, plumosity unilateral, short, decumbent, straight. *Metasomal* terga rather uniformly sculptured over anterior elevation and posterior depression, surface very feebly shining; metasomal sterna brownish, a little more shining than terga and more coarsely punctate. Length, approximately 10 mm.; anterior wing, 7 mm.

Holotype female (California Academy of Sciences, Entomol-

[2] All times reported in this paper are Pacific Standard Time.

ogy) from FIVE MILES SOUTHWEST OF SHANDON, SAN LUIS OBISPO COUNTY, CALIFORNIA, April 11, 1960, collecting pollen from *Oenothera dentata* at 7:33 a.m. (E. G. Linsley) and 53 ♀♀ paratypes (California Insect Survey) from the same locality at flowers of *Oenothera dentata* between 7:29 a.m. and 7:56 a.m. (E. G. Linsley and Juanita M. Linsley). Additional specimens, not designated as paratypes, include a female from 1 mile west of Little Rock, Los Angeles County, California, April 5, 1959, on *Oenothera micrantha* var. *exfoliata* at 8:56 a.m. (E. G. Linsley) and five females from Ventucopa, Santa Barbara County, California, March 21, 1959, in tunnels in the ground (R. P. Allen). Two females from Hungry Valley, 5 miles south of Gorman, Ventura County, California, May 7, 1959, collecting pollen from *Oenothera dentata* at 6:13 a.m. and 6:30 a.m. (J. R. Powers and G. I. Stage) differ by having the abdomen green instead of violaceous blue and may represent a closely related species or subspecies.

The female of this species superficially resembles other members of the *chalybioides-nothocalaidis* complex but differs in the form of the tibial scopa and the hairs which comprise it, the shallowly emarginate process of the labrum, and the presence of long hairs on both the first and second metasomal terga. It is also the most completely violaceous of the known members of this group.

ANDRENA (DIANDRENA) OLIVACEA Viereck

Andrena (Parandrena) olivacea Viereck, 1916, Proc. Acad. Nat. Sci., Philadelphia, 68:590, ♀ ♂.

This is a relatively common and widespread species associated with ephemeral spring Compositae on the Mojave and Colorado deserts of Southern California and adjacent areas. We have most frequently found it collecting pollen from *Malacothrix* and *Coreopsis*, usually in the latter part of the morning. In the early morning, 7:30–8:00 a.m., both sexes visit these and other plants for nectar, including *Oenothera dentata*. The female may be readily distinguished from other members of the *chalybiodis* group by the all-white facial pubescence and very feebly tessellate, shining, mesoscutum. The apex of the labral process is bilobed, the lobes globular and distinctly separated. The enclosure of the propodeum is finely rugulose with a distinct median longitudinal elevated line. The male is also much more obscurely tessellate and shining than those of the other species known to us and the process of the labrum is broad, deeply notched, and bilobed.

CYANOSOMA GROUP

ANDRENA (DIANDRENA) CYANOSOMA (Cockerell)

Diandrena cyanosoma Cockerell, 1916, Pomona Jour. Ent. Zool., 8:49, ♀ ♂.
Andrena (Parandrena) austrocalifornica Viereck, 1916, Proc. Acad. Nat. Sci., Philadelphia, 68:587, ♀. *New synonymy*

Examination of the types upon which these two names were based reveals that they represent a single species. *A. (D.)* CYANOSOMA collects pollen from *Oenothera* early in the morning. Females captured on April 23, 1959, 7 miles east of Temecula, Riverside County, California, were taking pollen from *Oenothera bistorta* var. *veitchiana* at 6:47 a.m. (Peter H. Raven).

ANDRENA (DIANDRENA) MACSWAINI Linsley

Andrena (Diandrena) macswaini Linsley, 1960, Pan-Pacific Ent., 36:97, ♀ ♂.

This species is closely related to *A. (D.) cyanosoma* (Cockerell), but differs in both sexes by the slightly less bluish integument, stronger, denser, and less regular sculpturing. The female further differs in the distinct, complete hair bands of abdomen, the irregular mesonotal pubescence and the longer erect hairs of the first metasomal terga. The male also differs further from that of *cyanosoma* by the all-white facial hairs and the very long hairs of the abdomen. *A. (D.) macswaini* collects pollen in the mornings from *Oenothera dentata*. We have found it thus far only in the southern part of the San Joaquin Valley, California.

Andrena (Diandrena) anatolis

Linsley and MacSwain, new species

Female.—Integument feebly shining, green, without bluish or violaceous reflections except on metasomal sternites and toward apex of clypeus, antennae brownish-black, dark red brown beneath, legs dark brown; pubescence white on clypeus, black or dark brown near eyes, antennae, and vertex, fimbria pale, tibial scopa predominantly pale, abdominal hair bands distinct, more or less complete. *Head* tessellate, shining; frons finely, longitudinally striate; clypeus finely punctate, sparsely pubescent, with an indication of a median elevated longitudinal, impunctate line; labrum with apical process very feebly emarginate and tumid at apex. *Mesosoma* with metanotum tessellate and indistinctly punctured, pubescence moderately short, dense, heavily plumose, a few long hairs on disk, mesoscutellum and metanotum more densely and distinctly reticulate-punctate; propodeum reticulate, enclosure poorly defined, less coarsely sculptured than adjacent areas, weakly, irregularly rugulose basally; wings tinted with pale brownish; posterior legs with tibial scopa moderately long, loose, the hairs pale, simple, and posteriorly directed beneath, dorsally a little denser, darker, and predominantly simple, a little longer than the width of the tibia above. *Metasoma* dull, finely, regularly tessellate,

punctures of first tergum indistinctly punctate, the punctures separated by from three to six diameters, pubescence moderately short, erect on first tergum, more or less appressed on following terga, apical hair bands successively more distinct on terga two to four, fifth tergum coarsely punctate; metasomal sterna shiny, finely punctate, thinly pubescent, posterior margins with a row of long, pale, suberect hairs. Length, approximately 6.5 mm., anterior wing, 5.7 mm.

Male.—Integument moderately shining, green, apices of depressed margins of third and fourth metasomal terga pale brownish; length approximately 5.5 mm.; anterior wing, 4.7 mm.

Holotype female (California Academy of Sciences, Entomology), from 7 MILES EAST OF TEMECULA, RIVERSIDE COUNTY, CALIFORNIA, April 23, 1959, collecting pollen from *Oenothera bistorta* var. *veitchiana* at 7:04 a.m. (Peter H. Raven); allotype male (P. H. Timberlake collection), from Riverside, Riverside County, California, March 4, 1932, sunning on ground (P. H. Timberlake). Paratypes, one female taken under the same conditions as the holotype at 7:29 a.m. (Peter H. Raven), two females from Claremont, Los Angeles County, California, April 17, 1959, taking pollen from *Oenothera bistorta* var. *veitchiana* at 8:10 and 8:30 a.m. (P. H. Raven), 6 males from Mira Loma, Riverside County, California, March 12, 1939 on *Ceanothus crassifolius* (R. C. Dickson), 10 females from Dripping Springs Guard Station (10 miles east of Temecula), Riverside County, California, March 22, 1960, at *Oenothera* between 9:10 and 9:25 a.m. (W. M. Klein), one female 9 miles north of Perris, Riverside County, California, April 10, 1946, on ground at burrow (P. H. Timberlake), one female from The Gavilan, Riverside County, California, March 6, 1935, on *Oenothera dentata* (C. M. Dammers), one female from Riverside, Riverside County, California, March 15, 1925, at cherry bloom (P. H. Timberlake), one female from Riverside, Riverside County, California, April 26, 1935, on *Oenothera dentata* (P. H. Timberlake), and 45 males from Riverside, Riverside County, California, various dates in February and March between 1928 and 1938 mostly at flowers of *Calandrinia Menziesii* or *Cryptantha intermedia* (P. H. Timberlake). Other specimens which appear assignable to this species but which have not been designated as paratypes are as follows: One female from Hungry Valley five miles south of Gorman, Ventura County, California, taking pollen from *Oenothera dentata* at 7:02 a.m. (G. I. Stage) and one female from Ventura, Ventura County, California, April 19, 1959, taking

pollen from *Oenothera cheiranthifolia suffructicosa* at 8:39 a.m. (P. H. Raven).

This species is smaller than either of the preceding and readily distinguished by the green rather than bluish coloration, the entire, feebly emarginate apex of the labral process, the poorly defined and weakly sculptured basal enclosure of the propodeum, the shallow punctation of the mesoscutum and first metasomal tergum, etc.

Andrena (Diandrena) anatolis matutina

Linsley and MacSwain, new subspecies

Female.—Integument shining; pubescence of head black or dark brown; labrum with apical process distinctly, evenly emarginate; length approximately 8 mm.; anterior wing 6 mm.

Male.—Integument shining, olive green, apices of depressed margins of third and fourth metasomal terga pale brownish; labrum with apical process broadly, evenly emarginate, somewhat bilobed; length approximately 6.5 mm.; anterior wing 5 mm.

Holotype female (California Academy of Sciences, Entomology) from 4.5 MILES SOUTH OF TULARE, TULARE COUNTY, CALIFORNIA, March 29, 1960, collecting pollen from *Oenothera dentata* var. *campestris* at 8:58 a.m. (J. W. MacSwain); allotype male (California Academy of Sciences, Entomology) from Tulare, Tulare County, California, March 9, 1939, taking nectar from *Amsinkia* (E. G. Linsley).

Paratypes (California Insect Survey and University of California, Riverside: 12 females same data as holotype, 1 male same data as allotype, 1 female from Tulare, Tulare County, California, April 29, 1960, gathering pollen from *Oenothera dentata* var. *campestris* (J. W. MacSwain), 3 females from 2.4 miles south of Tipton, Tulare County, California, March 29, 1960, gathering pollen from *Oenothera dentata* var. *campestris* (E. G. Linsley), 1 female from 20 miles east of Bakersfield, Kern County, California, April 19, 1958, at flowers of *Oenothera decorticans* but not collecting pollen (E. G. Linsley), 3 males from Tulare, Tulare County, California, March 9, 1937, at flowers of *Calandrinia* (P. H. Timberlake), 1 male from Earlimart, Tulare County, California, March 9, 1937, at flowers of *Calandrinia* (P. H. Timberlake).

Additional specimens, which are not designated as paratypes, are the following: one female from 2 miles southwest of Livingston, Merced County, California, April 4, 1959, at flowers of *Oenothera dentata* var. *campestris*, (G. I. Stage), and 2 males, 29 females from 2.5 miles south of Livingston, Merced County, California, between March 20 and April 6, 1960, at flowers of *Oenothera dentata var. campestris* (G. I. Stage and R. R. Snelling). Females from near Livingston differ in having the hairs of the face an intermixture of dark and pale hairs.

Andrena (Diandrena) eothina

Linsley and MacSwain, new species

Female.—Integument dark blue, feebly shining, metasomal terga with a greenish caste over elevated portions, legs, antennae, and clypeus (except base), dark brownish-black; pubescence of head (including face) dark brown, of thorax predominantly dark brown, of abdomen predominantly pale. *Head* tessellate, feebly shining, frons finely, longitudinally striate; clypeus shallowly but moderately densley punctate, without a median longitudinal impunctate line, pubescence thin, labrum with apical process deeply, angularly notched at apex, the lobes moderately small, tumid, divergent. *Mesosoma* with mesonotum dull, tessellate, distinctly punctate, the punctures mostly separated by less than a diameter, pubescence short, sparse, pale, densely plumose, with scattered long erect pale and dark hairs of unequal length intermixed; mesoscutellum and metanotum successively more densely punctate; propodeum reticulate-rugulose, the basal enclosure indistinctly margined, less coarsely sculptured than adjacent areas, a number of distinct longitudinal rugulae at base; wings tinted with pale brownish; legs with tibial scopa moderately long, thin, ventral hairs pale, mostly recurved slightly at apex, dorsal hairs suberect, much longer than width of tibia, mostly simple, a few sparsely plumose. *Metasoma* with first tergum finely, regularly tessellate, finely, indistinctly punctate, the punctures separated by from one to four diameters, pubescence sparse, moderately long, erect; terga two to four finely, more or less transversely rugulose over elevated portions, pubescence pale, moderately short, suberect, apical hair bands indistinct (worn); anal fimbria brownish; metasomal sterna shining, distinctly punctate, thinly pubescent, posterior margins with a row of long, pale, suberect hairs. Length, approximately 7 mm., anterior wing, 5.5 mm. (worn).

Male.—Integument of head green, of thorax and mesosoma green with bluish reflections, of propodeum violaceous; facial hairs long, white, covering clypeus, a few dark hairs near eye; metasomal hairs long, white, not exceeding length of terga. Length approximately 6 mm., anterior wing, 5 mm.

Holotype female (California Academy of Sciences, Entomology), from 18 MILES EAST OF BAKERSFIELD, KERN COUNTY, CALIFORNIA, April 20, 1958, taking pollen from *Oenothera dentata*, between 6:40 and 6:50 a.m. (E. G. Linsley), *allotype male* (California Academy of Sciences, Entomology) from the same locality, March 6, 1960, taking nectar from *Oenothera dentata* at 9:10 a.m. (E. G. Linsley); paratypes, two females from the same locality, April 11, 1958, taking pollen from *Oenothera dentata* between 6:45 and 8:00 a.m. (E. G. Linsley and J. W. MacSwain), and one male and 25 females from the same locality, between March 6 and April 3, 1960, taking nectar or pollen from *Oenothera dentata* (E. G. Linsley and J. W. MacSwain).

The female of this species differs at once from other members of the *cyanosoma* group by the dark blue integument, wholly dark facial hairs, and the sculpturing of the mesoscutum, propodeum, and abdomen. The male differs by having the metasomal hair bands distinct, suggesting that their indistinctness in the type is due to wear.

SPERRYI GROUP

ANDRENA (DIANDRENA) SPERRYI (Cockerell)

Diandrena sperryi Cockerell, 1937, Amer. Mus. Novitates, 948:14, ♀.

This species collects pollen in the morning from *Oenothera* on the western Mojave Desert and southern San Joaquin Valley, California. Our material includes the following:

Twenty ♀♀, Boron, Kern County, California, April 2 and 3, 1959, collecting pollen from *Oenothera dentata* var. *parishii* between 6:30 and 7:45 a.m. (E. G. Linsley and J. W. MacSwain); 13♀♀, same locality, April 10 and May 7, 1960, collecting pollen from *Oenothera dentata* var. *parishii* between 7:00 and 8:00 a.m. (E. G. Linsley and J. W. MacSwain); 4 ♀♀, 2 miles southwest of Livingston, Merced County, California, April 4 and 5, 1959, collecting pollen from *Oenothera dentata* var. *campestris* between 8:12 and 9:10 a.m. (G. I. Stage); 7 ♀♀ and 1 ♂ same locality, April 10, 1960, collecting pollen from *Oenothrea detata* var. *parishii* between 8:20 and 10:30 a.m. (G. I. Stage); 13 ♀♀, Short Canyon, 6 miles west of Inyokern, Kern County, California, April 13 and 14, 1960, collecting pollen from *Oenothera dentata* var. *johnstonii* between 7:45 and 9:16 a.m. (J. A. and J. W. MacSwain); 4 ♀♀, 7.2 miles northwest of Walker Pass Summit, Kern County, California, April 25, 1960, collecting pollen from *Oenothera dentata* between 10:17 and 11:05 a.m. (D. D. Linsdale); 2 ♀♀, Hungry Valley, 5 miles south of Gorman, Ventura County, California, May 7, 1959 (J. R. Powers); 19 ♀♀, 4 ♂♂, 2.5 miles south of Livingston, Merced County, California, March 20 to 26 and April 2 and 6, 1960, collecting pollen from *Oenothera dentata* var. *campestris* (G. I. Stage and R. R. Snelling); 2 ♀♀, 2 ♂♂, 18 miles east of Bakersfield, Kern County, California, April 11 and 20, 1960, visiting flowers of *Oenothera dentata* var. *parishii* (E. G. Linsley and J. W. MacSwain); 4 ♂♂, 5 miles west of Lancaster, Los Angeles County, April 11, 1958 (E. G. Linsley and J. W. MacSwain); 5 ♂♂, 5 miles south of Lancaster, Los Angeles County, California, April 11, 1958 (J. W. MacSwain); one male, 15 miles east of Kramer Junction, San Bernardino County, California, April 12, 1958 (J. W. MacSwain); 4 ♀♀, Kramer Hills, San Bernardino County, California, May 1, 1958 (P. D. Hurd and G. A. Marsh); 2 ♀♀, one mile west of Kramer, San Bernardino County, California, April 2, 1959, one taking pollen from *Oenothera dentata* var. *parishii* at 8:52 a.m., the other visiting *Oenothera clavaeformis* at 8:05 a.m. but bearing a pure load of pollen from *Oe. dentata* var. *parishii* (E. G. Linsley), 3 ♀♀, five miles west of Salt Wells, San Bernardino County, California, April 1,

1959, gathering pollen from *Oenothera dentata* var. *parishii* at 8:08 a.m. (R. W. Thorp), and 11 ♀♀, one mile west of Little Rock, Los Angeles County, California, April 4, 5, 13, 1959, collecting pollen from *Oenothera micrantha* var. *exfoliata*, between 7:14 a.m. and 9:25 a.m. (E. G. Linsley, J. W. MacSwain, P. H. Raven).

This a very small, slender, shining species with pronounced bands of metasomal pubescence.

A NEW STATE RECORD FOR THE BEE GENUS HETERANTHIDIUM WITH COMMENTS ON H. ZEBRATUM CRESSON[1]

(Hymenoptera: Apoidea)

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Heteranthidium zebratum subtimberlakei Schwarz, from Nevada County, California, represented the previously recorded northern limit of the genus *Heteranthidium* in western America (Schwarz, 1928). A series of 40 females of *Heteranthidium zebratum* was collected five miles west of Suttle Lake, Oregon, July 30, 1939, by Schuh and Gray. The abundance of specimens from this locality would suggest that the species probaby occurs north of Suttle Lake in the higher elevations of the Cascades.

The variability in body maculation and punctation is so great among the 40 specimens, that typical forms of both *zebratum subtimberlakei* and *z. zebratum* occur within the series. The subspecies *z. subtimberlakei* was based on a single female and distinguished from the other subspecies by: the absence of the supraclypeal spot, maculations on the scutellum, and femoral stripes; two broadly interrupted maculations on the sixth metasomal tergum; the larger maculations behind the compound eyes extending towards the lateral ocelli; and by having the inner orbital margins unmistakably convergent above.

Except for the convergence of the inner orbital margins above and the extension of the maculations toward the lateral ocelli, the specimen of *subtimberlakei* could be included among the variants of the polymorphic *z. zebratum*.

The degree of maculation variability among the 40 specimen collected at Suttle Lake, Oregon, is recorded in the following paragraph. The comments are restricted to those characteristics previously used in taxa discrimination within the genus.

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[1] Supported by The National Science Foundation, under grant number 4575.

The supraclypeal spotting varies from bright yellow to pale whitish-yellow in color; there may be a single large maculation covering most of the supraclypeal area, two small spots located at either side, a small median spot, or, in one specimen, an absence of any maculations. The maculations behind the eye vary from one large spot which extends half way from the inner orbital margins to the lateral ocelli; a large spot which terminates immediately above the compound eye; two spots behind the compound eye, the second spot smaller and located below the larger elongated stripe. There is a single maculation on the anterior half of the mesopleuron, varying from a small obscure spot at the upper anterior margin, to a large spot covering most of this structure. The axillae are totally yellow in some specimens and black in others. The scutellum is devoid of maculations in about half of the specimens but in some there is a trace of a single or double spot, while in others the two spots are so large that they are almost continuous across the apical margin. The first metasomal tergum may have a complete yellow band, or two broadly interrupted lateral spots. The sixth metasomal tergum usually has two moderately-sized, comma-shaped maculations on either side; in a number of specimens the spots are large and separated by a narrow black stripe; in one specimen the tergal markings are absent. The maculations on the third tibia range from a broad continuous yellow band from the base to the apex, to the absence of any color. Similarly the maculation on the third basitarsus varies from complete banding to its absence.

About half of the specimens resemble *subtimberlakei* in having the inner orbital margins slightly convergent above. The remainder have the inner orbital margins parallel, while in one specimen the margins are slightly divergent above.

All of the variations cited above occur within the range of variability already cited for *zebratum*. This may indicate that *z. subtimberlakei* may represent a segment of a population showing the same degree of variation as that exhibited by the Oregon material. It is also possible that the populations designated as the subspecies *subtimberlakei* may represent an aberrant, divergent phyletic line of the species *zebratum*. However, its distribution in relation to the Oregon material and the other subspecies would make this conclusion appear to be unlikely.

Considering the entire range of *z. zebratum* with its great

variability in maculation patterns, the Oregon population appears to resemble the Wisconsin, *z. chippewaense* (Graenicher) most closely. This is particulary true of the general reduction in the extent of maculation. In both groups there is a tendency towards a reduction or even absence of maculation on the scutellum and axillae. The frequency of interruption of the yellow band on the first metasomal tergum is greatest in the areas to which each is endemic.

The extent of the polymorphism in the Oregon population makes the subspecific assignment of these specimens difficult, and casts some doubt on the validity of *subtimberlakei*. In view of the similarity between the Wisconsin and Oregon populations, it appears as if they may represent northern biotypes of the highly polymorphic *z. zebratum*, and as such would not merit subspecific designation. Until more comprehensive studies are undertaken on the genus, the Oregon populations are tentatively placed with the subspecies *z. zebratum* and referred to as that subspecies in a forthcoming paper on northwestern bees.

LITERATURE CITED

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1928. Bees of the subfamily *Anthidiinae*, including some new species and varieties, and some new locality records. Jour. New York Ent. Soc. 36: 409–415.

RELEASES OF RECENTLY IMPORTED INSECT PARASITES AND PREDATORS IN CALIFORNIA, 1958–59

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The following list, reporting the first field releases of certain imported species of parasites and predators by the Department of Biological Control, supplements preceding biennial reports beginning with the years 1952–53. The year of first release is 1958 unless otherwise indicated.

The species listed in the 1956–57 report as *Aphytis* sp. (Burma) has since been described as *Aphytis fisheri* DeBach; both of the parasites listed as *Aphytis* sp. (India) and *Aphytis* sp. (Pakistan) have since been described as a single species, *Aphytis melinus* DeBach.

The releases of weed-feeding insects were conducted in co-

operation with the Entomology Research Division, United States Department of Agriculture.

Host and Parasites or Predators	*Origin*	*Area or County of Release*
MACROSIPHUM PISI (Harris)		
Aphidius smithi Sharma & Rao	India	General
Aphidius medicaginis Marshall*	France	Riverside
		San Bernardino
		San Diego
		Santa Barbara
CHROMAPHIS JUGLANDICOLA (Kltb.)		
Trioxys pallidus Haliday*	France	General
AONIDIELLA AURANTII (Mask.)		
Aphytis n. sp. (Israel)*	Israel	Riverside
SAISSETIA OLEAE (Bern.)		
Coccophagus basalis Comp.*	Brazil	Los Angeles
		Orange
		Riverside
		Ventura
SAISSETIA HEMISPHAERICA (Targ.)		
Coccophagus basalis Comp.*	Brazil	Orange
		Santa Barbara
COCCUS HESPERIDUM L.		
Coccophagus basalis Comp.*	Brazil	Orange
		San Diego
		Santa Barbara
Thalassa montezumae Muls.	Mexico	Kern
		Orange
		Santa Barbara
ICERYA PURCHASI Mask.		
Rodolia iceryae Janson	So. Africa	Glenn
		Riverside
PSEUDOCOCCIDAE		
Scymnus sp. (near *quadrivittatus*)*	So. Africa	Orange
		Ventura
Diomus sp.	Brazil	Ventura
OLIGONYCHUS PUNICAE (Hirst)		
Stethorus sp.*	Hawaii	San Diego
		Santa Barbara
TETRANYCHUS Spp.		
Stethorus jujunus Casey	So. Africa	Riverside
SENECIO JACOBAEA L.		
Tyria jacobaeae L.*	France	Mendocino
HELIX Spp.		
Euglandina rosea (Ferrussae)	Hawaii	Riverside

* First release made in 1959.

SYNONYMICAL NOTES ON THE GENUS CERCERIS—III[1]

(Hymenoptera: Sphecidae)

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A grant from the National Science Foundation made it possible for the writer to visit numerous European institutions during the fall of 1959 for the purpose of studying type material of the tribe Cercerini from North and South America. The present notes are based on these studies. A study of type material deposited in European museums revealed numerous cases of synonymy in the Sphecoid tribe Cercerini from North and South America. The following are herein placed on record.

CERCERIS AZTECA Saussure

Cerceris azteca Saussure, 1867. Reise d. Novara. Zool. II. P. 1. Hymen. p. 97, n. 18. ♀. "In Agro Mexicano frequens. In partes calidas provinciae urbis Mexico prope Yautepec et Cuautla 8 ♀ in Julio cepi, et in Orizaba 2 ♀ in Martio."

Cerceris seminigra Banks, 1947. Psyche 54:33–34. ♂. "One ♂ from Patagonia, Arizona, 20 August (Bequaert)." *New Synonymy*

The female holotype of *C. azteca* Saussure is at the Naturhistorisches Museum, Wien (Vienna), Austria. The male holotype of *C. seminigra* Banks is at the Museum of Comparative Zoology, Harvard (No. 27621).

CERCERIS BICORNUTA BICORNUTA Guerin

Cerceris bicornuta bicornuta Guerin, 1845. Iconogr. Regene. Anim., Ins., 7, p. 443. ♀. United States.

Cerceris curvicornis Cameron, 1890. Biol. Cent.-Amer., Hym., v. 2: 124. ♂. Mexico, Presidio de Mazatlan (Forrer). *New Synonymy*

The female holotype of *C. bicornuta* Guerin is at the Museo Civico di Storia Naturale, Genova. The male holotype of *C. curvicornis* Cameron is in the British Museum (No. 21.1,430).

CERCERIS BLAKEI Cresson

Cerceris blakei Cresson, 1865. Ent. Soc. Phila. Proc. 5:121. ♀. Louisiana.

Cerceris elegans F. Smith, 1856. Catal. Hymen. Brit. Mus. 4: 467. ♂. America: Florida. *New Synonymy*

Cerceris elegantissima Schletterer, 1887. Zool. Jahrb. ztschr. f. system 2:490; new name for *C. elegans* F. Smith, which was preoccupied.

The holotype male of *C. elegans* F. Smith is in the British

[1]Grants for General Research administered by the Graduate School, Oregon State College, have assisted in these studies. Published with the approval of the Monographs Publication Committee, Oregon State College, Research paper No. Department of Entomology.

Museum (No. 21.1.365). The holotype female of *C. blakei* Cresson is in the Philadelphia Academy of Natural Sciences.

Cerceris californica californica Cresson

Cerceris californica Cresson, 1865. Ent. Soc. Phil. Proc. 5:128. ♂. California.
Cerceris calodera Banks, 1947. Psyche 54:22–23. "One ♂ from Jacumba, Calif., 12 August 1917 (W. M. Wheeler)." *New Synonymy*

The holotype male of *C. californica* Cresson is at the Philadelphia Academy of Natural Sciences (No. 1953). The holotype male of *C. calodera* Banks is at the Museum of Comparative Zoology, Harvard (No. 27622).

Cerceris cribrosa Spinola

Cerceris cribrosa Spinola, 1841. Soc. Entom. France Ann. 10, No. 74, p. 119. ♀,♂. America, Cayenne (French Guiana, Inini).
Cerceris subpetiolata Saussure, 1867. Reise d. Novara. Zool. II. P. 1. Hymen. p. 95, n. 15. ♂, ♀. America: Mexico. *New Synonymy*

A female apparently determined by Spinola as *C. cribrosa* Spinola is in the Institute e Museo di Zoologia, Torino, Italy. This has been selected by the present author as a neotype and is so labeled.

The holotype female of *C. subpetiolata* Saussure is in the Naturhistorisches Museum, Wien (Vienna), Austria.

Cerceris dilatata Spinola

Cerceris dilatata Spinola, 1841. Soc. entom. France Ann. 10, p. 108. ♂. America: Cayenne (French Guiana, Inini).
Cerceris maximiliani Saussure, 1867. Reise d. Novara. Zool. II. P. 1. Hymen. p. 94, n. 14. ♀. America: Mexico. *New Synonymy*
Cerceris semiatra Banks, 1947. Psyche 54:33. ♂. Arizona. *New Synonymy*

A male determined by Spinola as *Cerceris dilatata* Spinola is in the Instituto e Museo di Zoologia, Turin (Torino), Italy. It has been designated a neotype by the present author. A female named by Spinola as *C. dilatata* Spinola is also at Torino. The holotype of *C. maximiliani* Saussure was not found in Wien (Vienna) where most of Saussure's types are deposited or in Geneva where some of his material is located. A female apparently determined by Saussure and located in the Museum d'Histoire Naturelle, Geneva, was designated and labeled a lectotype. The type of *C. semiatra* Banks is in the Museum of Comparative Zoology, Harvard (No. 27620).

Cerceris frontata Say

Cerceris frontata Say, 1823. West. Quart. Rptr. 2:80. ♀. Southwest United States.

Cerceris occidentalis Saussure, 1867. Reise d. Novara. Zool. II. P. 1, Hymen. p. 100, n. 23, ♀. America: Texas. *New Synonymy*

Cerceris texensis Saussure, 1867. Reise d. Novara. Zool. II. P. 1, Hymen. p. 89, n. 3, ♀. America: Texas. *New Synonymy*

No types of *C. occidentalis* Saussure were found at Geneva or Vienna. A specimen at Geneva determined by Saussure was designated a lectotype by the writer. It is a typical female of *C. frontata* Say. No holotype of *C. texensis* Saussure was found either in Geneva or Wien (Vienna). A male which appears to have been labeled as such by Saussure is in Geneva. It is a typical male of *C. frontata* Say.

CERCERIS IMPERIALIS Saussure

Cerceris imperialis Saussure, 1867. Reise d. Novara. Zool. II. P. 1, Hymen. p. 98, n. 21, ♀. America: Mexico temparata.

Cerceris exsecta F. Smith, 1873. Ann. and Mag. Nat. Hist. (4) XII. p. 410, ♀. America: Mexico. *New Synonymy*

Cerceris pilosa Cameron, 1890. Biol. Cent.-Amer., Hym., 2:128. ♂. America: Guatemala. *New Synonymy*

The holotype of *C. imperialis* Saussure was not found either in Geneva or Vienna. However, a female so labeled at Geneva, apparently by Saussure, was designated a lectotype. The holotypes of *C. exsecta* F. Smith (No. 21.1,429) and *C. pilosa* Cameron (No. 21.1,436) are in the British Museum.

CERCERIS MIMICA Cresson

Cerceris mimica Cresson, 1872. Amer. Ent. Soc. Trans. 4:228. ♀, ♂. Texas.

Cerceris esau Schletterer, 1887. Zool. Jahrb., Ztschr. f. System. 2:458. ♀. America: Mexico. *New Synonymy*

The holotype of *C. mimica* Cresson is in the Philadelphia Academy of Natural Sciences (No. 1943). A female specimen of *C. esau* Schletterer in the Vienna Museum which appeared to belong to the original type series was designated a lectotype by the present author.

CERCERIS SEXTA Say

Cerceris sexta Say, 1837. Boston Jour. Nat. Hist., 1:382. Mo. ♂.

Cerceris orphne Banks, 1947. Psyche 54:15–16. One mile from Jemez Springs, New Mexico, 2 July (Englehardt). ♂. *New Synonymy*

The male type of *C. sexta* Say has been lost. The identification of the species is based on specimens determined by Cresson. The holotype male of *C. orphne* Banks is at the Museum of Comparative Zoology, Harvard (No. 23536).

CERCERIS SIMPLEX F. Smith

Cerceris simplex F. Smith, 1856. Catal. Hymen. Brit. Mus. 4:462, ♀, ♂. America: Brazil.

Cerceris affumata Schletterer, 1887. Zool. Jahrb. Ztschr. f. System 2:455. ♀. America: Brazil. *New Synonymy*

The holotype of *C. simplex* F. Smith is in the British Museum (No. 21.1.438). The holotype of *C. affumata* Schletterer is in the Naturhistorisches Museum, Wien (Vienna).

Cerceris tepaneca Saussure

Cerceris tepaneca Saussure, 1867. Reise d. Novara. Zool. II. P. 1, Hymen. p. 90, n. 5. ♂. America: Mexico temperata: Orizaba.

Cerceris sextoides Banks, 1947. Psyche 54:10. ♀, ♂. America: western United States. *New Synonymy*

A male specimen of Saussure's original type series in Wien (Vienna) has been designated a lectotype. The holotype of *C. sextoides* Banks is in the Museum of Comparative Zoology, Harvard (No. 23547).

Cerceris tolteca Saussure

Cerceris tolteca Saussure, 1867. Reise d. Novara. Zool. II. P. 1, Hymen. p. 94, n. 13. ♀, ♂. America: Mexico.

Cerceris cosmiocephala Cameron, 1904. Invert. Pacif. Vol. 1, p. 67. ♂. San Marcos, Nicaragua.

No holotype of *C. tolteca* Saussure was found either in Wien (Vienna) or Geneva. A female specimen determined as such by Saussure was designated lectotype in Geneva. The holotype male of *C. cosmiocephala* Cameron is in the British Museum (No. 21.1,373).

Cerceris verticalis F. Smith

Cerceris verticalis F. Smith, 1856. Cat. Hym. Brit. Mus. 4:466. ♀. Georgia.

Cerceris gnara Cresson, 1872. Amer. Ent. Soc. Trans. 4:229. ♂. Texas. *New Synonymy*

Cerceris firma Cresson, 1872. Amer. Ent. Soc. Trans. 4:229. ♀. Texas. (Recent synonymy. Scullen, 1960. Pan-Pac. Ent. 36:78.)

The holotype female of *C. verticalis* F. Smith is in the British Museum (No. 21.1,428). The types of *C. gnara* Cresson and *C. firma* Cresson are in the Philadelphia Academy of Natural Sciences, types No. 1938 and 1945 respectively.

Eucerceris lacunosa Scullen

Eucerceris lacunosa Scullen, 1939. Oregon State Monog., Studies in Ent. 1:19. ♂. Arizona to western Texas.

Eucerceris arizonensis Scullen, 1939. Oregon State Monog., Studies in Ent. 1:20. ♀. Arizona to western Texas. *New Synonymy*

The holotypes of both *E. lacunosa* Scullen and *E. arizonensis* Scullen are in the University of Kansas. When the original descriptions of these species were published the author indicated that *arizonensis* might prove to be the female of *lacunosa*. Since that

time both species have been taken on the same day and location by several collectors and no other specimens have been taken which could possibly be the opposite sex of either. The author is now convinced that these are the opposite sexes of the same species.

EUCERCERIS MONTANA Cresson

Eucerceris montanus Cresson, 1882. Amer. Ent. Soc. Trans. 10:viii. ♀, ♂. Montana.

Cerceris sonorensis Cameron, 1891. Biol. Cent.-Amer., Hym., 2:129. ♂. America: Mexico. *New Synonymy*

The holotype female of *E. montana* Cresson is in the Philadelphia Academy of Natural Sciences, type No. 1946. The holotype male of *C. sonorensis* Cameron is in the British Museum (No. 21.1,435).

REMARKS ON THE CLASSIFICATION AND NOMENCLATURE OF THE AMERICAN TENEBRIONINE GENUS ADELONIA

(Coleoptera: Tenebrionidae)

T. J. SPILMAN

Entomology Research Division, Agr. Res. Serv., U.S.D.A.

Merotemnus and its only included species, *elongatus*, were described by Horn in 1870 (p. 367). Not long afterward it was realized that the name of the species was a synonym of *Uloma (Adelonia) filiformis* Laporte, 1840 (p. 221), and since that time the species has been known as *Merotemnus filiformis* (Laporte). Somehow the name *Adelonia* Laporte, 1840 (p. 221), has been ignored, even though *filiformis* is its monobasic type species. The generic names should also have been synonymized, for they have the same type species through subjective synonymy. In the future, therefore, this species should be called *Adelonia filiformis* Laporte.

Horn, in his original description, placed the genus in the Ulomini, where it remains to this day. He was probably overly influenced by the superficial ulomine appearance of the species. It is shiny, testaceous, and rather compact, but because of the open coxal cavities he should have considered placement in the Tenebrionini. Tribal differences in the Tenebrionidae are vague in many cases, so I am not able to give characterizations of the Tenebrionini and Ulomini. However, one character seems constant, namely that the tenebrionines have laterally open middle coxal cavities so that the trochantin is visible, whereas the ulomines

have laterally closed middle coxal cavities so that the trochantin is hidden. Once *Adelonia* is in the Tenebrionini, it must then be placed in the section of the tribe that does not have a membrane between the third, fourth, and fifth visible abdominal sternites. Here we find the genus *Rhacius* Champion, 1885 (p. 120). If we compare the type species of *Rhacius*, which is *R. sulcatulus* Champion, 1885 (p. 121, pl. 6, fig. 9), with *Adelonia filiformis*, we see little difference except in sculpture. The coarse punctures, the tubercles, the raised elytral intervals, and the dull surface of *sulcatulus* are the opposites of those found in *filiformis*, but it should be realized that these characters are of no more than specific rank. The two species have virtually the same body shape, dorsal surface of the head, eyes, antennae, mentum, and legs; it is in these structures that one usually finds generic differences in the Tenebrionini. Finally, the most noticeable, if not the most significant piece of evidence in favor of the union of these two genera, is the presence of the pronounced spine on the middle and hind femora. Surely these two genera would not have been kept separated this long if they had not mistakenly been placed in different tribes. *Rhacius* should therefore be considered a junior synonym of *Adelonia*.

Adelonia will now contain 12 species; the following 11 were in *Rhacius: baeri* (Pic), *costipennis* (Blair), *cylindica* (Kulzer), *deplanata* (Pic), *diversipes* (Pic), *nitida* (Gebien), *opatroides* (Perty), *quadricollis* (Champion), *rufa* (Pic), *sulcatula* (Champion), and *vicina* (Pic). Of the 12 only three occur north of the Isthmus of Panama, and those three are easily identified.

Key to the species of Adelonia of Central and North America

1. Pronotum and elytra laterally tuberculate, with punctures of irregular shape ..... *sulcatula* (Champion)
   Pronotum and elytra not tuberculate, with punctures of usually circular or oval shape 2
2. Pronotum subequal in width and length, though appearing longer than broad; elytra with intervals flat on disc; pronotum without marginal carina medially on posterior border ..... *quadricollis* (Champion)
   Pronotum broader than long and appearing so; elytra with intervals convex on disc; pronotum with marginal carina medially on posterior border ..... *filiformis* Laporte

The distribution of *Adelonia filiformis* is recorded in the literature as California and Baja California. Laporte merely listed North America in his original description. Lacordaire's

1859 (p. 333) statement that the species is from Cayenne is certainly an error; he did not know the species except from description. Horn wrote concerning his own specimen, "... presented to Dr. Leconte by Mr. Ulke who received it from California." This specimen is not in the LeConte or Horn Collections. The only other mention of California, except in catalogues, is by Fall in 1901 (p. 173), but he does not give a specific place of capture in that state, and his statement is vague. Nor is there at present a California specimen of the species in the California Academy of Sciences, the University of California, the Museum of Comparative Zoology, the American Museum or Natural History, the Academy of Natural Sciences of Philadelphia, or the United States National Museum. If anyone knows of Californian specimens of *Adelonia filiformis*, it would certainly be of value to make them known. A rather good record of its distribution in Baja California was given by Blaisdell in 1943 (p. 269). All the exact localities known to me are from the southern half of Baja California, the most northern locality being Santa Rosalia.

Adelonia sulcatula is the most common species in the genus. It is known from Central and South America, the West Indies, and from Texas in the United States. *Adelonia quadricollis* is recorded from British Honduras, Guatemala, and Columbia. To that list I am able to add Costa Rica on the basis of specimens in the U.S. National Museum.

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THE SOLDIER FLIES OR STRATIOMYIDAE OF CALIFORNIA. By Maurice T. James. *Loc. cit.*, 6(5):79–122, pls. 6–10, 19 maps. April 22, 1960. Price $1.00.

THE STONEFLIES (PLECOPTERA) OF CALIFORNIA. By Stanley G. Jewett, Jr. *Loc. cit.*, 6(6):125–178, 41 text figs., frontispiece. June 17, 1960. Price $1.25.

BOOK NOTICE

DICTIONARY of word roots and combining forms. Compiled from the Greek, Latin, and other languages, with special reference to biological terms and scientific names. By Donald J. Borror. N-P Publications, Palo Alto, California, pp. vi+134. 5″x7″. Price $2.00. Published September 15, 1960.

This pocket-sized booklet combines some of the best features of each of several larger word books for naturalists, and has innovations of its own. Pages 3 to 6 have rules (with examples) for the pronunciation of scientific names. The dictionary proper has over 7,000 roots and combining forms; in each case the source language is shown, and special marks indicate whether a root is usable alone, or normally as a suffix. Following this are sections on the formulation of scientific names, the translation of Greek words, and a subject classification of some common combining forms. The typography is excellent, on a white paper of good quality. This is definitely a "most for the money" book, recommended for its content and its ease of use.—Hugh B. Leech, *California Academy of Sciences, San Francisco.*

CROSSBREEDING STUDIES WITH TWO CLOSELY RELATED SPECIES OF LIRIOMYZA

(Diptera: Agromyzidae)

EARL R. OATMAN[1]

The melon leaf miner, *Liriomyza pictella* (Thomson) and the tomato leaf miner, *Liriomyza munda* Frick are economically important pests in most of the agricultural areas of California. The melon leaf miner is primarily destructive to melons, alfalfa, and beans, whereas, the tomato leaf miner is principally injurious to tomato (Frick, 1957; Oatman and Michelbacher, 1958; and Oatman, 1959).

Frick (1957) distinguished three species of *Liriomyza* (*pusilla* complex) on the basis of five morphological characters through a statistical treatment of 100 specimens taken at random. He noted an overlapping of most characters between the species. The principal difference was based on the color of the genovertical plates. The plates are yellow in *L. munda*, whereas, in *L. pictella* and *L. brassicae* (Riley), they are infuscated at least to the upper frontoorbital setae. Frick also stated that in teneral specimens the infuscation is frequently very faint or sometimes lacking. He also reported that *Datura meteloides* D.C., a weed growing in waste areas, was the native host of the tomato leaf miner, but that the melon leaf miner also occurred on this weed. The melon leaf miner was reared more readily on *D. meteloides* than on tomato in laboratory host range studies (Oatman, 1959).

In studying the biology and ecology of the melon leaf miner (Oatman and Michelbacher, 1958 and 1959), numerous surveys were conducted in order to determine the seasonal activity of the insect on wild and cultivated plants. Miners were first observed April 14 on the cotyledons of newly-emerged Persian melon and on the basal leaves of alfalfa and wild sunflower. By June 9 they were common in alfalfa, bean and melon fields. However, leaf miners were not observed on tomato until June 15 when a few mines were found on plants in a home garden surrounded by melon and bean fields. The first mine in commercial tomato fields was not found until August 1 when the melon leaf miner was present in large numbers in adjacent melon fields. This indicated that under natural field conditions, tomato is less pre-

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ferred than melons, and an infestation in the former does not occur until a high population develops on melon.

Adult specimens reared on melon or tomato are difficult to separate morphologically. No structural differences were found by the writer in either the male genitalia or the larval spiracles.

The leaf miner from tomato was reared on tomato, bean, alfalfa, and melon plants in laboratory host range studies. Tomato was the most severely mined when the above plants were simultaneously exposed. In similar studies where the leaf miner was obtained from melon, tomato was only lightly mined and alfalfa, bean, and melon were severely mined (Oatman, 1959). This was the first biological evidence that the leaf miners on tomato and melon were biologically different. The tomtao leaf miner larvae were darker brown when reared on tomato than bean and similarly darker than larvae of the melon leaf miner on bean. This suggested the possibility that the color difference between adults of the two leaf miners might be due to the influence of their hosts.

Most of the field observations and laboratory data, however, indicated that the leaf miners on melon and tomato might be the same species. The principal exception was the apparent laboratory host preference of the two. Crossbreeding experiments with the two miners were established.

Methods and Materials.—Tomato leaves infested with tomato leaf miner larvae were collected from a large commercial field near Linden, California, on September 21, 1955, and brought into the laboratory. The puparia formed by emerging larvae were placed into individual vials. Puparia of the melon leaf miner, from a known stock culture used for life history and ecological studies (Oatman and Michelbacher, 1958 and 1959), were similarly handled. Emerging adults from one host were placed on caged bean plants with adults of the opposite sex and host source. Individual adults were paired in all except four tests where five adults were placed together with five adults of the opposite sex and host source (table 1). The tests were discontinued two weeks after the last stage obtained or after F_2 adults emerged. The original pairs were kept for identification. Where F_2 adults were obtained, the original pair were determined by Dr. K. E. Frick of the Irrigation Experiment Station, Washington State University, Prosser, Washington.

Three crossbreeding experiments were conducted under green-

TABLE 1. Results of crossbreeding studies using *Liriomyza munda* Frick and *Liriomyza pictella* (Thomson) where adults were maintained on Henderson bush lima bean plants under greenhouse conditions.

Cross			F_1 stage attained[a]					F_2 stage attained			
Liriomyza munda	*Liriomyza pictella*	Mating observed	Eggs	Larvae	Pupae	Adults	Mating observed	Eggs	Larvae	Pupae	Adults
♀[b]	♂										
♀	♂		+								
♀	♂		+								
♀[b]	♂										
♀	♂		+								
♀	♂		+								
♂	♀		+								
♂	♀		+								
♂	♀[c]										
♂[d]	♀		+	+	+	+	+	+	+	+	+
♂[d]	♀		+	+	+	+	+	+	+	+	+
♂	♀		+								
5♂♂	5♀♀		+								
5♂♂	5♀♀		+	+	+	+	+	+			
5♀♀	5♂♂	+	+	+	+	+	+	+			
5♂♂ & 5♀♀			+	+	+	+	+	+	+	+	+

a—Tests discontinued after two weeks if eggs did not hatch.
b—Female died two days after emergence.
c—Female did not produce either egg or feeding punctures in leaves.
d—Males later identified as *L. pictella* by Dr. Kenneth E. Frick.

house conditions averaging 26° C. and 34% R.H. A total of 61 tomato leaf miners (25 females and 36 males) and 51 melon leaf miners (31 females and 20 males) was included in 40 separate tests.

Results.—The results of the first experiment are shown in table 1. Eight females oviposited infertile eggs. In two tests, F_2 adults were obtained. The original males of these two tests were later identified as *L. pictella* by Dr. Frick, whereas, they were originally setup in the experiment as *L. munda*. In two of the tests involving five individuals from each host, F_1 adults were produced. These mated and oviposited normally, but laid infertile eggs. The 10 tomato leaf miner adults in the check reproduced normally.

In the second experiment involving 15 tests, one mated female did not lay eggs. F_2 adults were produced in two tests, but the data had to be discarded because of the loss of the original female in one test and the discovery of an extra original male in the second. Eleven females laid infertile eggs. The male and female tomato leaf miner in the check reproduced normally.

A third experiment consisted of nine paired individuals. Two females did not produce feeding or egg punctures. Three laid infertile eggs although one was observed mating. Puparia of the F_1 generation were obtained in two tests. F_2 adults were produced in one test, but again the male was identified as *L. pictella* by Frick, whereas, it was setup in the experiment as *L. munda*. The male and female melon leaf miner in the check reproduced normally.

Discussion.—Seventy-three percent of the females in the single-paired tests oviposited infertile eggs. One pair was observed mating. In comparison, during life history studies of the melon leaf miner (Oatman and Michelbacher, 1958), less than 10 percent of the females laid infertile eggs when caged with males; mating was commonly observed; and unmated females deposited infertile eggs.

Both mating and oviposition of fertile eggs occurred in nine of the 40 crossbreeding tests. F_1 pupae were obtained in two single-paired tests; F_2 eggs in two multiple-paired tests; and F_2 adults in five single-paired tests.

Frick's identification of the original males as melon leaf miner in the tests where F_2 adults were produced was based on single

specimens. Frick (1957), (and in personal communication) stated such determinations are difficult and sometimes questionable. Therefore, the males could have been the tomato leaf miner as originally setup in the experiments. Most of the data would substantiate this. If inter-breeding did occur, however, it was rare and probably does not occur in nature.

The data confirms Frick's morphological distinction of the leaf miners as two species (Frick, 1957).

The melon and tomato leaf miners appear to be sibling species from sympatric natural populations (Mayr, Linsley, and Usinger, 1953).

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BOOK REVIEW

GUIDE TO THE INSECTS OF CONNECTICUT. Part VI, The Diptera. Seventh Fascicle. Psychodidae, by Laurence W. Quate. 32 pages, 7 plates of figures. 1960.

This is Bulletin 92, one of a useful series put out by the State Geological and Natural History Survey. The author, a world authority in this family of flies, begins with a general description of the little "moth-flies" and notes the habits. Some domesticated species may develop in houses, particularly in kitchen drains. Blood-sucking, disease-carrying "sand flies" of the genus *Phlebotomus* are mentioned, but they do not come north to Connecticut.

The author presents a brief analysis of the psychodid fauna of Connecticut and adjacent northeastern states. The 38 species involved are now in eight genera and three subfamilies (36 of the species in the Psychodinae). The flies are easily recognized from their thickly haired, roof-like wings and peculiar, primitive wing venation, with its lack of usual crossveins and the presence of two branched veins.

The morphology is discussed, with emphasis on characters useful in taxonomy. Both male and female genitalia possess good characters, which are illustrated. The antennae are useful in characterization, particularly the flagellar segments. Techniques for preparation are explained, as these delicate little insects must, for specific determination, be mounted on slides.

In order to give a complete picture the author includes two subfamilies which have not been taken in Connecticut, these are Trichomyiinae, represented by *Trichomyia nuda* (Dyar), and Phlebotominae, represented by *Phlebotomus vexator* Coquillett. In the subfamily Psychodinae we have the remainder of the psychodids found in this region.

In the genus *Pericoma* there are nine species listed, eight being well enough known to key out; the Northwestern *kincaidi* is included, also *carolina*, a North Carolina species. Some of the species are widespread.

The genus *Telmatoscopus* Eaton will not be found in our older literature, but nine species are briefly described in this paper. The species *varitarsis* (Curran), *latipennis* Quate, and *nebraskensis* Quate were eastern forms not actually taken in Connecticut. *T. furcatus* (Kincaid) is very widespread and ranges far north to Fort Churchill and Alaska. The large, dark colored *basalis* (Banks) is one of the commonest species in North America and breaks up into subspecies west of the 100th Meridian.

The broad-winged *Brunettia* is represented by *nitida* (Banks), described in *Psychoda*. It has colorful iridescent scales on the wings. Three other species, formerly in *Psychoda* are described under *Philosepedon* Eaton. Two species of *Threticus* Eaton are described and keyed; of these *bicolor* (Banks) once belonged to *Psychoda*.

The old genus *Psychoda* Latreille still has some species (12) remaining These are the small, dull-colored forms, commonest of the family, and as Quate remarks "typify what most people usually picture psychodids to be." The type is the ancient *Tipula phalaenoides* of Linnaeus. Some of these species breed in wet organic matter, and the larvae of some may live in cow dung. Most of the species are widespread, but *thrinax* Quate and *setigera* Tonnoir have not quite reached Connecticut.

The bulletin concludes with a bibliography, index, and seven plates of outline drawings. Most of the drawings illustrate the specifically distinct male genitalia, but there are some drawings showing wing venation, and some of the strangely ornamented segments of the antennal flagellum. The descriptions throughout the study are "cut to the bone" but adequately cover all of the salient characters used in the classification of these unusual little moth-flies.—Frank R. Cole, *University of California, Berkeley.*

PACIFIC COAST ENTOMOLOGICAL SOCIETY

J. W. TILDEN, *President* — P. H. ARNAUD, JR., *Vice-President* — F. E. SKINNER, *Secretary* — R. C. MILLER, *Treasurer*

PROCEEDINGS

Two Hundred and Sixty-eighth Meeting

The 268th meeting was held Saturday, March 19, 1960, at 2:00 p.m., in the Morrison Auditorium of the California Academy of Sciences, San Francisco, with President Tilden presiding.

Members present (31): P. H. Arnaud, Jr., D. C. Brodahl, W. A. Doolin, R. L. Doutt, J. G. Edwards, E. O. Essig, W. E. Ferguson, D. Giuliani, K. S. Hagen, R. E. Hall, D. H. Huntzinger, K. F. Innes, Jr., E. L. Kessel, R. L. Langston, J. F. Lawrence, T. C. Lawrence, H. B. Leech, D. D. Linsdale, C. D. MacNeill, D. M. Maddox, A. E. Michelbacher, J. E. Milstead, J. A. Powell, E. S. Ross, Judy Ross, F. E. Skinner, R. F. Smith, R. R. Snelling, G. I. Stage, J. W. Tilden, R. H. Van Zwaluwenburg.

Visitors (13): R. C. Ballard, P. S. Barker, H. C. Brodahl, J. W. Chapman, D. M. Fanard, Mrs. D. M. Fanard, Stephenie Ferguson, B. S. Perry, B. E. Pullen, Soemarlan, Bruce Tilden, Hazel Tilden, Jan Tilden.

The minutes of the meeting held December 12, 1959 were read and approved.

Two new members were elected: Cyril F. dos Passos, Mendham, New Jersey, and Arnold S. Menke, Davis, California; and Roy R. Snelling, Turlock, California, and Gerald I. Stage, Berkeley, California, were reinstated to membership.

The Society was saddened to learn of the death of Mrs. C. A. Richmond in Tyngsboro, Massachusetts, August 31, 1959. Mrs. Richmond, the sister of Dr. Henry C. Fall, was responsible for the establishment of the Fall Memorial Fund of our Society, following the death of Dr. Fall in 1939.

President Tilden appointed a science fair exhibit judging committee of K. S. Hagen, chairman, Laura M. Henry, and H. B. Leech; and an annual field day committee of D. P. Furman, chairman, J. A. Powell, and F. E. Skinner.

Mr. Soemarlan, an Indonesian entomologist, currently studying at San Jose State College, presented a talk on the entomological activities relating to malaria eradication in Indonesia.

David H. Huntzinger, a summer ranger-naturalist in Crater Lake National Park, spoke on the entomological and other natural history activities in the Crater Lake area, and illustrated his talk with a large series of color slides of this interesting region.

The meeting adjourned to informal discussions in the entomology rooms.—FRANK E. SKINNER, *Secretary*

Two Hundred and Sixty-ninth Meeting

The 269th meeting was held Friday, April 15, 1960, at 7:30 p.m., in the Morrison Auditorium of the California Academy of Sciences, San Francisco, with Vice-President Arnaud presiding.

Members present (31): Rev. T. S. Acker, P. H. Arnaud, Jr., D. C. Brodahl, W. A. Doolin, R. L. Doutt, J. G. Edwards, E. O. Essig, K. S. Hagen, T. R. Haig, Jr., R. E. Hall, D. H. Huntzinger, E. L. Kessel, R. L. Langston, H. B. Leech, C. D. MacNeill, D. M. Maddox, P. M. Marsh, A. E. Michelbacher, J. E. Milstead, J. A. Powell, J. R. Powers, D. C. Rentz, D. W. Ribble, E. S. Ross, W. A. Russell, K. P. Shea, F. E. Skinner, S. D. Smith, R. R. Snelling, G. I. Stage, L. A. Stange.

Visitors (13): H. C. Brodahl, D. J. Burdick, B. N. Chaniotis, Alice Edwards, Jane Edwards, Richard English, Jr., Marie Essig, W. G. Iltis, Berta B. Kessel, Robin Leech, Martha Michelbacher, B. S. Perry, C. B. Perry.

The minutes of the meeting held March 19, 1960 were read and approved.

Two new members were elected: Stewart S. Fullerton, Modesto, California, and Paul R. Ehrlich, Palo Alto, California.

It was announced that Harry A. Hill, a member of the Society since 1948, died in Berkeley, California, February 12, 1960.

K. S. Hagen reported that the science fair judging committee had found no suitable entomological entries to be judged in this year's fair.

J. A. Powell announced that the annual field day would be held May 7 at Russelmann Park.

R. L. Doutt presented a note on heterogeny (alternation of generations) in gall-making cynipids in California, and exhibited galls of three species in three genera.

He also displayed a series of fine water color illustrations of various parasitic Hymenoptera by Hans Peeters, of Berkeley, California.

D. C. Rentz reported that nymphs of the grasshopper, *Chimarocephala pacifica pacifica* (Thomas), in the San Miguel Hill area of San Francisco in 1959 were parasitized by tachinids, and as many as five parasites per grasshopper emerged and pupated. He also displayed specimens.

K. S. Hagen exhibited three species of *Calosoma*, and reported that *C. tristoides* Fall has recently been taken in the Central Valley of California as far north as Merced County, where it feeds on armyworms in alfalfa. It was previously known only in the Los Angeles area. He also showed larvae of *Silpha* and *Calosoma* for comparison, as the two are frequently confused.

J. A. Powell gave the following note: "The gulf fritillary, or passion vine butterfly, *Agraulis vanillae* (Linnaeus), has been established in southern California, dependent on the ornamental passion vines grown in yards, at least since 1876 (Coolidge, 1924, Ent. News 35:22). During the past two years mild climatic conditions have enabled the species to spread northward in California and become established in numerous places in the Central Valley and along the coast at least to the San Francisco Bay Area (Calif. Dept. Agr., Coop. Ins. Pest Rept., Oct. '59:6). Tilden and Arnaud are gathering records on its occurrence in 1959 to be reported elsewhere. Speculation has arisen as to whether the species would survive the current winter in this area in view of apparent colder spells this year. On January 17 larvae were collected from *Passiflora caerulea* in Berkeley from which a male and a female emerged February 5 and 6. Adults

and larvae were occasionally seen on this vine last fall, but during February and March, 1960 the vine was essentially defoliated, and it seems unlikely that the butterfly was developing there in any stage at that time. However, on April 10 a female *A. vanillae* was observed there ovipositing on fresh growth. Thus it seems that the species has been able to overwinter in this area again, and it appears likely that we will continue to see the butterfly flying about the passion vines this season."

J. A. Powell also presented the following note, accompanied with two color slides of the caterpillars concerned: "*Dicentria pallens* (Strecker), a notodontid moth, is widespread in the western United States, but specimens from California are apparently rare in collections. With the assistance of John Chemsak six larvae were collected at Mt. St. Helena, Napa County on December 6, 1959 on *Arbutus menziesii* saplings. The larva, which superficially resembles that of *Schizura unicornis* (J. E. Smith), displays a remarkable protective coloration in this particular habitat. The meso- and metathoracic segments are not pigmented externally and appear identical in color to the leaf material being eaten due to the body contents. The abdominal segments are red-brown, mottled with blackish and pale areas dorsally. These dark patches strikingly resemble necrotic areas on the host leaves which seemed to be especially abundant on the young trees at this locality. Thus the caterpillars were extremely difficult to locate when at rest on the plants. The pupae were formed in tough, oval silken cocoons just below the surface of the ground. One male emerged March 21, leaving a circular hole visible at the soil surface."

P. H. Arnaud, Jr., exhibited specimens of a crane fly, *Tipula vestigipennis* Doane, taken at the edge of the Presidio, in San Francisco, in which the wings are so reduced that flight is not possible.

J. G. Edwards presented the following note: "On April 2, 1960, one of our graduate students, Ronald Stecker, was collecting above Stevens Creek Reservoir, northwest of San Jose, and obtained a few specimens of *Chariessa elegans* Horn, running about on the trunk of a felled Canyon Live Oak (*Quercus chrysolepis* Liebm.). The next day we visited the area together, and found three more beetles of this species. On April 5th I returned alone and found none on that log but discovered a newly-felled log of the same kind nearby that was literally crawling with these rare beetles, along with a species of *Xylotrechus*. The tree had been felled the previous day about noon. I easily collected more than 35 of beetles in about ten minutes, and allowed fully that many to remain, so that Ronald could get more for himself the next day. Unfortunately, the following day when he and a friend returned they searched for hours and found only one *Chariessa*, even though they spent most of that time examining the log that had been so attractive to the beetles the day before. My theory is that they are only attracted to the trees that have been felled within 24 hours, or (less strongly attracted) within 48 hours. This may account for the comparative scarceness of these brilliant red and blue beetles in insect collections."

Brief reports of travels of members of the Society were made. H. B.

Leech noted that Borys Malkin is currently on a collecting trip in São Paulo, Brazil, and that P. D. Hurd, Jr. is about to start a journey down the Amazon River as part of his year's activities in South America. P. H. Arnaud, Jr. mentioned that Robin Leech is on a trip to South America, Antarctica, and Cambodia, and also that E. S. Ross has just returned from a four-month journey to Europe, Madagascar, and Africa.

The major portion of the program was by Rev. T. S. Acker, a former student of G. F. Ferris, who presented an illustrated discussion of "The morphology of the male terminalia of Neuropteroid insects." [Subsequently published in *Microentomology*, Vol. 24, No. 2, pages 25–84, August 31, 1960.]

A color movie, "Rival World," was shown. This film, available through the courtesy of the film library of the Shell Oil Company, San Mateo, California, showed attempts at locust control in Africa, and illustrated several phases of medical entomological problems.

The meeting adjourned to a coffee social in the entomology rooms.

—FRANK E. SKINNER, *Secretary*

Two Hundred and Seventieth Meeting

The 270th meeting, the annual field day, was held Saturday, May 7, 1960, at Russelmann Park, near Clayton, Contra Costa County, California.

Members present (16): D. C. Brodahl, J. G. Edwards, E. O. Essig, W. E. Ferguson, R. L. Langston, K. L. Maehler, A. E. Michelbacher, J. A. Powell, D. C. Rentz, E. S. Ross, W. A. Russell, W. E. Simonds, F. E. Skinner, J. W. Tilden, M. S. Wasbauer, R. F. Wilkey.

Visitors (49): Laura Bonhag, Philip Bonhag, Robert Bonhag, Rose Bonhag, Cristine Books, J. A. Chemsak, Mary Ann Chemsak, H. V. Davis, Alice Edwards, Jane Edwards, Jeanne Edwards, Mary English, Richard English, Jr., Mrs. Richard English, Sr., Marie Essig, Rick Ferguson, Robin Ferguson, Stephenie Ferguson, George Haughey, Mary Haughey, Ann Langston, Evelyn Langston, Jeff Lewis, Hilda Linares, Norman Maehler, Roger Maehler, Martha Michelbacher, Erika Miller, Carrie Powell, Frances Powell, Clark Ross, Martha Ross, Wilda Ross, Elsa Russell, Beatriz Sarmiento, J. H. Sedlacek, J. H. Sedlacek, Jr., June Simonds, David Skinner, Jean Skinner, Roger Skinner, Susan Skinner, Bruce Tilden, Hazel Tilden, Jan Tilden, Jimmy Tilden, Dorothy Wilkey, Frank Wilkey, John Wilkey.

A fair spring day, the recreational facilities of Russelmann Park, and the natural history interests of the northeast slopes of Mount Diablo, provided a most suitable combination for the varied activities of the group.

—FRANK E. SKINNER, *Secretary*

Two Hundred and Seventy-first Meeting

The 271st meeting was held Saturday, November 12, 1960, at 2:00 p.m., in the Morrison Auditorium of the California Academy of Sciences, San Francisco, with President Tilden presiding.

Members present (31): R. P. Allen, P. H. Arnaud, Jr., D. C. Brodahl, H. V. Daly, R. L. Doutt, J. G. Edwards, P. R. Ehrlich, E. O. Essig,

W. E. Ferguson, S. M. Fullerton, O. W. Graf, Jr., Hilary Hacker, K. S. Hagen, R. E. Hall, P. D. Hurd, Jr., R. L. Langston, J. F. Lawrence, H. B. Leech, D. D. Linsdale, C. D. MacNeill, A. E. Michelbacher, J. A. Powell, D. C. Rentz, E. S. Ross, T. N. Seeno, F. E. Skinner, S. D. Smith, R. W. Stark, W. A. Steffan, J. W. Tilden, R. L. Usinger.

Visitors (24): Janice Addy, N. D. Addy, R. Benton, R. M. Brown, D. J. Burdick, Richard English, Jr., Marie Essig, Robin Ferguson, Stephenie Ferguson, D. Hennings, Grace Hurd, Kathryn Hurd, Ann Langston, Evelyn Langston, Robin Leech, R. S. Macdonald, M. Marquis, Martha Michelbacher, E. G. Munroe, Catherine Toschi, Melanie Webster, G. H. Wells, Christea Wemmer, Carole Yale.

The minutes of the meeting held April 15, 1960 and of the annual field day held May 7, 1960 were summarized.

Nine new members were elected: L. Clair Armin, Reedley, California; Howell V. Daly, Berkeley, California; F. E. Ellertson, Hood River, Oregon; J. C. Hitchcock, Fresno, California; Carl O. Mohr, Berkeley; J. S. Moure, Curitiba, Paraná, Brazil; R. W. Stark, Berkeley; Wallace A. Steffan, Berkeley; George Walters, Loma Linda, California.

Stanley B. Freeborn, Chancellor Emeritus of the University of California at Davis, and a Society member since 1925, died in Woodland, California, July 19, 1960.

President Tilden appointed a nominating committee of J. A. Powell, chairman, R. L. Doutt, and C. D. MacNeill; and an auditing committee of E. S. Ross, chairman, K. S. Hagen, and H. B. Leech.

E. S. Ross displayed a Riker mount with several fossils of various orders of insects, from a shale deposit near Cedar Mountain, Mina, Nevada, near Hawthorne, collected earlier this year in company with R. L. Usinger during a Biosystematists' field trip. The locality is about a nine-hours' drive from San Francisco, and is readily accessible to collectors, but detailed directions for finding the precise locality are necessary. Members were urged to undertake research on this material, but should first contact Prof. D. E. Savage of the Museum of Paleontology, University of California, Berkeley.

K. S. Hagen circulated pinned specimens of four species of economically important fruit flies (Tephritidae)—the Mexican, oriental, Mediterranean, and melon—and asked members to immediately report capture of any of these species to appropriate authorities. This is especially important in view of the two specimens of the oriental fruit fly found this year in southern California.

J. A. Powell gave the following note, and exhibited specimens: "Specimens of *Adela singulella* Walsingham were collected near Ukiah, Mendocino County, California, May 22 by S. F. Cook, Jr. The species has rarely, if ever, been taken since its first collection by Lord Walsingham in Mendocino County in May 1871. Members of *Adela* are small, day-flying moths, easily recognizable by the very long antennae of the males, and are often seen visiting flowers. The females have somewhat shorter antennae and are of a different color than the white-spotted males, frequently

being shining blue or green. Three local species fly during March, April and May in meadow situations of the coastal hills and are at times quite common. Males are occasionally observed in groups of a dozen or two individuals engaged in dancing flights several feet above the ground, but the females are less conspicuous and are to be found individually moving about amongst low-growing plants."

"The specimens were presented in hopes that *Adela* will be recognized and more often collected during the next few years, in anticipation of a survey bulletin on the California species. Records are especially needed from areas north of Sonoma County and south of Monterey Bay."

J. W. Tilden commented that these are one of the few groups of moths that swarm and dance like some flies. He has at times observed these moths apparently "hill-topping" much as certain other Lepidoptera are known to do.

P. R. Ehrlich reported the occurrence of mites on butterflies in the Santa Rita mountains, the first association of this type known to him.

H. B. Leech exhibited two books: Borror, D. J. 1960. Dictionary of word roots and combining forms. N-P Publications, Palo Alto, California. 134 pp. $2.00. Anderson, R. F. 1960. Forest and shade trees entomology. Wiley, New York. 428 pp. $8.50.

Robin Leech showed several color slides of the 1959-1960 Bishop Museum entomological expedition to Antarctica.

Dr. E. G. Munroe, Entomology Research Institute, Ottawa, Canada, editor of the *Canadian Entomologist*, and visiting Lecturer in Entomology during the fall 1960 semester at the University of California, Berkeley, gave the major presentation of the meeting, "Moths and moth collecting in New Guinea," illustrated with a large series of color slides of his very interesting trip.

The meeting adjourned to a coffee social in the entomology rooms.

—FRANK E. SKINNER, *Secretary*

Two Hundred and Seventy-second Meeting

The 272nd meeting was held Friday, December 16, 1960, at 7:30 p.m., in the Morrison Auditorium of the California Academy of Sciences, San Francisco, with President Tilden presiding.

Members present (28): R. P. Allen, L. C. Armin, P. H. Arnaud, Jr., D. C. Brodahl, J. G. Edwards, H. Ellis, W. E. Ferguson, S. M. Fullerton, D. P. Furman, Hilary Hacker, Laura M. Henry, P. D. Hurd, Jr., D. Hynes, R. L. Langston, J. F. Lawrence, T. C. Lawrence, H. B. Leech, C. D. MacNeill, C. O. Mohr, Sheila Palmer, J. A. Powell, D. C. Rentz, C. J. Rogers, E. S. Ross, F. E. Skinner, W. A. Steffan, J. E. Swift, J. W. Tilden.

Visitors (8): P. P. Cook, C. Dudley, Richard English, Jr., Mrs. D. P. Furman, Mrs. C. O. Mohr, A. E. Palmer, R. L. Palmquist, R. H. Whitsel.

The minutes of the meeting held November 12, 1960 were summarized.

Seven new members were elected: H. R. Dodge, Missoula, Montana; Cornell Dudley, Lafayette, California; Ronald H. Goodwin, Berkeley,

California; Jaren Horsley, San Leandro, California; W. G. Iltis, Davis, California (student member); David H. Kistner, Chico, California; Hubert W. Prescott, Forest Grove, Oregon.

The Society regretfully learned of the death of Dr. Edwin P. Meiners, a member of the Society since 1952, in St. Louis, Missouri, October 28, 1960.

E. S. Ross, chairman of the auditing committee, reported that the financial records of the past year were in order, and his report was accepted by the Society.

Chairmen of the various standing committees of the Society briefly reported on the activities of the past year.

H. B. Leech, chairman of the historical committee, announced that the Society has received for its historical files a set of the *Entomological Newsletter* dating from 1951, through the courtesy of R. G. Wigmore of the Science Service Department, Canada Department of Agriculture, Ottawa.

J. A. Powell, chairman of the nominating committee, presented the names of the nominees, and the following people were elected as Society officers for 1961: President, Paul H. Arnaud, Jr.; Vice-President, Kenneth S. Hagen; Secretary, Frank E. Skinner; Treasurer, Robert C. Miller.

D. C. Rentz presented the following note and exhibited specimens: "In the fall of 1948, Dr. Edward L. Kessel discovered the presence of the Australian sod fly, *Metoponia rubriceps* Macquart (Stratiomyidae), on the lawn of the University of San Francisco. The fly has since spread to nearly all parts of San Francisco. It may be seen commonly on lawns, paths, and walls during its two annual flight periods. The first flight takes place in the spring and lasts for a few weeks. The fall flight is most prolific. The flies are the most common insect about. Females seem to be sitting on each blade of grass. The male may be found flying near the females which are so rotund that they are unable to fly. The eggs are deposited in the ground and a spoonful of dirt may yield a dozen or more larvae."

"The Australian sod fly is a reported pest in Australia and more so in New Zealand where it feeds on monocotyledonous plants. The most heavily attacked are sugar cane, lawns, and corn."

"The fly is at present known in California only from San Francisco and a golf course in northern San Mateo County. No damage to lawns can be attributed to it. Only time will tell whether *M. rubriceps* will become another pest with which the farmer, as well as the private-home owner, will have to contend."

R. P. Allen gave the following note: "*Eriococcus pittospori* Ferris is not known anywhere else but parts of the Golden Gate Park, and its immediate vicinity, in San Francisco. There is an abundance of it in the trees just west of the Academy, also at the park entrance across Fulton Street from the El Portal. It is found mostly on the trunks. *Pittosporum tenuifolium* and *P. undulatum* are heavily attacked, also the mirror plant, *Coprosma baueri*. *Pittosporum crassifolium* and *P. eugenioides* are less severely attacked, and there are no other known hosts."

J. W. Tilden commented on a mealybug that is killing *Araucaria* on the San Jose campus.

Retiring President Tilden presented the Annual Address, titled "Entomological teaching—in 1961."

An extended discussion followed, indicating that the teaching of entomology is a matter of important concern to many members of the Society.

E. S. Ross then narrated a series of his fine color slides showing the facilities and personnel of many of the European entomological institutions which he recently visited while en route to Madagascar. A second series of collecting and travelling scenes in Ethiopia was also greatly appreciated and enjoyed.

The meeting adjourned to a coffee social in the entomology rooms.

—Frank E. Skinner, *Secretary*